

**Arms Control and the Revolution in  
Military Affairs**

**Summary of the Seventh Annual International  
Conference on Controlling Arms**

**Defense Special Weapons Agency**

**United States Department of Defense**

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**8-11 June 1998**



## PREFACE

*Arms Control and the Revolution in Military Affairs* is a report on the presentations and discussions of the Defense Special Weapons Agency's Seventh Annual International Conference on Controlling Arms. The conference is organized each year to provide a multinational forum for topics pertaining to policies, technologies, and operations of arms control, including treaty arrangements, cooperative threat reduction, and proliferation prevention and response. The 1998 meeting was held at the Wyndham Franklin Plaza Hotel in Philadelphia, Pennsylvania, from 8 to 11 June.

This report is a summary of the conference sessions, based on rapporteurs' notes and, in some cases, written material provided by presenters. The speeches by General John M. Shalikashvili, Senator Sam Nunn, the Honorable John D. Holum, and the Honorable John J. Hamre are presented verbatim as furnished by the speakers themselves or their respective agencies.

The views presented are those of the conference participants and do not represent the views of the Defense Special Weapons Agency, the Department of Defense, Science Applications International Corporation (SAIC), or the Center for Verification Research (CVR).

Debbie Lincoln of SAIC/CVR and Jessica Kaplan of SAIC edited this report. The rapporteurs were Jeannie Borden, Charmaine Franck, Jeffery Heftman, Jacqueline McClay, Michael McGovern, Alexis Miller, Christina Ratchner, and Karla Tejada. The editors wish to extend their appreciation to Richard Soll and Verne Wattawa for their guidance and contribution, as well as to Barbara Hester, Linda Duffie, and Bill Haas for their editorial and substantive support.



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## OVERVIEW

### ARMS CONTROL AND THE REVOLUTION IN MILITARY AFFAIRS

The changing nature of technology and the proliferation of advanced commercialized technology are causing a transformation in the nature of threat and security issues and perceptions. The role of technology within the security environment has greatly enhanced the capabilities of both state and non-state actors. Concurrently, the use of technology has increased the vulnerabilities of states to the point where actors with a minimal amount of resources, such as transnational groups or terrorist organizations, can inflict significant harm on their victims. Although these actors are not capable of attacking the United States or its allies head-on, they may be able to exploit technology or use weapons of mass destruction (WMD) to present the United States or its allies with asymmetric threats and attacks. As a consequence, the traditional objectives and methods surrounding arms control and threat reduction must be adapted to incorporate these new threats and to inject some certainty into an uncertain situation.

In order to address this emerging situation, the United States Defense Special Weapons Agency (DSWA) held its Seventh Annual International Conference on Controlling Arms from 8 to 11 June 1998 in Philadelphia, Pennsylvania. The conference was attended by nearly 350 individuals from several countries, representing government, military, industry, research and development (R&D), and academic communities. The theme of the 1998 conference was *Arms Control and the Revolution in Military Affairs (RMA)*, focusing on the relationship between defense roles and missions and arms control requirements and results in light of the emerging political and military environment. Specifically addressed during

the conference were the impacts of the current RMA on defense policies, system requirements, and operations and the implications for arms control, threat reduction, and the prevention of proliferation and terrorism.

The conference theme was defined in the opening remarks by DSWA's Director, Major General Gary L. Curtin, USAF. He noted that the concept of controlling arms encompasses not only treaty-based arms control methods, but also cooperative threat reduction, proliferation prevention, terrorism prevention, and confidence-building and transparency measures. He also pointed out that the responsibility for controlling arms cuts across virtually the entire range of defense missions and requirements. Arms control activities are now taking place in an environment of monumental change, caused by the ongoing RMA. In general, revolutions in military affairs occur when there are innovations in military-related technologies (such as aviation, nuclear weapons, and missileery), and countries or coalitions make a concerted effort to harness the new technology in order to reap its benefits. The current RMA, sparked by rapid advances in information technologies stemming mainly from demands and innovations in the commercial sector, is capable of affecting all aspects of military and arms control matters.

The conference theme was elaborated upon during presentations given throughout the conference. Featured speeches are included in their entirety in the current report. The keynote speaker, General John M. Shalikashvili, USA (Ret), former Chairman of the Joint Chiefs of Staff, focused his remarks on further defining the RMA concept

and its relationship to arms control. In general, he noted that arms control continues to serve as a critical national security tool, fulfilling the objectives of making the world a safer and more secure place in which to live by reducing or eliminating destabilizing arms or weapon systems. He also pointed out that the current RMA is a marriage between dominant battlespace awareness, with extremely precise deep strike capabilities, and advanced stealthy technologies, working in combination to provide full dimensional protection.

General Shalikashvili focused on three aspects of the arms control-RMA relationship: the impact of arms control on the RMA, the impact of the RMA on the process of controlling arms, and the impact of the RMA on the substance of controlling arms. With regard to the first issue, General Shalikashvili indicated that there were two potential scenarios to be considered. The first scenario states that arms control could constrain development and deployment of RMA systems, weapons, and concepts, thus potentially hampering dominance of the battlespace and safeguarding of troops. The second scenario holds that arms control could provide useful constraints to the fielding and employment of certain capabilities by potential adversaries, thus ameliorating some of the problems arising from the global nature of the RMA. On the issue of the impact of the RMA on the process of controlling arms, he asserted that RMA technologies have the potential to provide a significant increase in transparency, thus enhancing confidence in the fulfillment of arms control commitments. Finally, with regard to the impact of the RMA on the substance of arms control, he noted that RMA-related technologies and systems could have a significant impact on arms race stability and crisis management. He also asserted that the requirement for a multi-tiered mis-

sile defense architecture incorporating RMA technologies will impact the Anti-Ballistic Treaty (ABM) Treaty, the Strategic Arms Reduction Treaty (START) I and II, and efforts to control the proliferation of missile defense technology.

The 9 June luncheon speech, given by Senator Sam Nunn, Senior Partner at King & Spalding, took the theme introduced by Major General Curtin and General Shalikashvili one step further. Senator Nunn focused his remarks on the need for a revolution in the thinking about arms control – both in concept and in definition – to accompany the current RMA. In order to illustrate the need for this arms control revolution, he posed eight scenarios describing real and fictional situations concerning WMD and cyberspace warfare. Within this context, Senator Nunn pointed out that the United States is currently undergoing both a revolution in military affairs and a revolution in the threat to vital information. The U.S. infrastructure is completely accessible through public networks, providing a target-rich environment for terrorists and criminals. Protection of this infrastructure will require a public-private partnership based on cooperation and information sharing. On the issue of threats, Senator Nunn noted that, along with information warfare, the collapse of the Soviet Union and the continuing weakness and uncertain future of Russia pose the greatest threat to U.S. security interests. While the Cooperative Threat Reduction (CTR) program has made tremendous progress in addressing the vulnerabilities of the former Soviet Union's (FSU) nuclear arsenal and cadre of nuclear experts, much more remains to be done.

The information warfare threat was further discussed during a dinner speech by the Honorable John D. Holum, Director, U.S. Arms Control and Disarmament Agen-



cy and Acting Under Secretary of State (Arms Control and Nonproliferation). Mr. Holum noted that the emerging threat of cyberspace war is an international cause inviting multinational and diplomatic approaches. The recent issuance of Presidential Decision Directive (PDD) 63 – launching a national initiative to address this “weapons of mass disruption” threat – was meant to provide a foundation for U.S. participation in the development of appropriate responses. Mr. Holum suggested that responding to information warfare vulnerabilities and providing for critical infrastructure protection will require participation by both public and private experts with arms control and foreign policy experience, defense and high-tech expertise, and a willingness to expand the parameters of how threats to national security are viewed. He also provided an overview of the impact of recent nuclear tests by India and Pakistan, asserting that the United States has a fundamentally sound arms control strategy to address both the policy and the means of responding to the Indian and Pakistani nuclear tests, one that relies on consistent intelligence, policy-making, strategic planning, and diplomacy. One of the most important aspects of both the U.S. and international responses to the tests is that other would-be proliferators understand that such activities carry untenable consequences. Mr. Holum noted the one positive by-product of the Indian and Pakistani tests is that they brought arms control issues to the forefront of world affairs. He proposed this situation be used to re-focus attention on five important areas of arms control: ratification of the Comprehensive Test Ban Treaty (CTBT); compliance with the Chemical Weapons Convention’s (CWC) industry provisions; augmentation of biological weapons (BW) counterterrorist training and preparations; the development of a strong compliance and transparency regime for the Biological Weapons Conven-

tion (BWC); and advancement on strategic arms control issues.

The final speaker, the Honorable John J. Hamre, Deputy Secretary of Defense, discussed the threat reduction aspects of the previous speeches, bringing them to a logical conclusion. He noted that containing the spread of and threat from chemical, biological, and nuclear weapons represents the greatest security challenge of the next decade. As a result, reduction of this threat now constitutes a primary defense mission for the future. In recognition of this reality, the Department of Defense (DoD) is in the process of establishing a new organization to address these issues directly. The Defense Threat Reduction Agency (DTRA) has been given three missions: maintaining the current U.S. nuclear deterrent capability, reducing the threat from WMD, and countering WMD threats. He asserted that the fulfillment of DTRA’s third mission will require consequence management, and for the first time, a Commander in Chief (CINC) will be assigned responsibility for a homeland territorial defense mission. An Advanced Systems Concepts Office will serve as the central nervous system for DTRA, helping DoD to think through threat reduction requirements in an integrated fashion; evaluating resourcing, planning, and programming at DTRA; and examining the future in ways not yet considered. In addition, a Threat Reduction Advisory Committee will be established to develop a clear vision to guide DTRA for the next three to four years.

Along with the featured speeches, plenary and panel discussions throughout the conference addressed various aspects of the theme. The first plenary session, *Arms Control and the Revolution in Military Affairs: Implications for Defense Planning*, dealt with the existing DoD and arms control missions. In particular, it was noted that

current DoD emphasis is fulfilling the requirements of *Joint Vision 2010*, and that if arms control is to continue to play a significant role in national security policy, it must effectively harness the technologies being pursued in the current RMA. From the perspective of military planners, a major cause for concern is that arms control will drive national security strategy rather than ensuring that it supports this strategy. An additional constraint on U.S. defense planners is humanitarian-based initiatives driven by non-governmental organizations (NGOs), as exemplified by recent activities on the banning of anti-personnel landmines. Another current factor is that DoD is no longer the first among equals, but now faces competing claims for resources from the civilian sector. Regarding strategic arms control, panelists noted that a START III treaty would likely be the last using the traditional bilateral arms control approach. In this multipolar era, future treaties will require the participation of most, if not all, nuclear powers. Discussions on CTBT focused on the fact that the treaty is in the interest of the United States and other nuclear states. Panel members also described recent activities surrounding the science-based stockpile stewardship program, which is being administered by the Department of Energy to ensure the continued safety and reliability of the stockpile while adhering to the principles of the CTBT.

The first panel discussion, *Technological Proliferation and Arms Control*, focused specifically on the technology issues associated with the RMA. Panel members discussed asymmetrical challenges posed by the proliferation of technologies associated with the RMA. This proliferation has occurred through the increased availability of expertise and technologies; relatively inexpensive chemical, biological, and radiological weapons; cyberspace weapons;

and information warfare techniques. This exponential growth of technology has implications for the relevancy of traditional arms control measures. In particular, the focus of arms control is moving from delivery systems to weapons and from the quantity to the quality of armaments. The pursuit of necessary R&D measures and the development of new monitoring technologies that adequately provide for the capability to stem technology proliferation are arms control priorities for the future.

Panel Two, *Threat Reduction Programs: Beyond CTR*, examined the specifics of the CTR program and its potential applicability beyond the FSU to prevent, reduce, roll back or eliminate threats to regional or global stability. By way of background, panelists noted that the CTR program has evolved from a quick fix to an enduring component of U.S. national security strategy, replete with congressional support and implemented by various agencies of the U.S. Government. The flexibility of this program was exemplified by the success of the military-to-military contacts project, preemptive acquisition efforts, and spin-off projects such as the Materials Protection, Control, and Accounting Program. A discussion on extending the basic approaches and ideas into other regions also took place. The ongoing bilateral scientific dialogues and NGO support of these activities have proven to be effective in areas where policy disagreements between states have prevented more direct government dialogue. In addition, CTR involvement in FSU BW defense programs is also proving to be a major benefit with regard to the acquisition of scientific information.

The second plenary session, *Arms Control in Light of Evolving Defense Requirements*, focused on defining current defense requirements and exploring the impli-

cations for traditional arms control. According to panel members, nuclear weapons will remain a cornerstone of the international security arena for the foreseeable future. In light of this reality, nuclear weapons and the nuclear triad will continue to play a central role in U.S. security strategy. As such, according to one panelist, maintaining the integrity of the U.S. nuclear infrastructure, a cadre of experts, and force readiness should be the highest priority of defense planners. It was also suggested that threat assessment rather than advancements in technology should drive defense requirements and national security strategy formulation. In addition, the discussion focused on the limitations of multilateral arms control due to the significant costs, constraints, and implementation challenges. One critique of multilateral arms control approaches proffered that such approaches have been unsuccessful in curbing proliferation and arms races in the third world. However, panelists stated that confidence and security building measures (CSBMs) and regional agreements have the potential to address many of the limitations associated with multilateral arms control. A proposal for a new vision of arms control that moves the focus away from arms reductions and toward more cooperative methods was identified. Within this context, it was suggested that counter-proliferation activities, theater missile defense (TMD), RMA approaches, and enhanced intelligence related to monitoring and verification should be pursued. In addition, a more proactive and creative conception of export control was suggested to cope with the increased diffusion of advanced technologies.

Panel Three, *Nuclear Force Reductions: Where Are the Knees in the Curve?* dealt with the issue of further reductions in nuclear forces and potential breakpoints, or “knees in the curve,” calling for

new thinking and responses in the strategic environment. Several specific examples of “knees in the curve” were examined. In particular, it was noted that offense-defense capabilities are at a turning point due to the development of missile defense technology, requiring a closer examination of the ABM Treaty and a reassessment of the security situation in general. Panel members also indicated that if further nuclear weapon reduction negotiations between the United States and Russia reach below the benchmark level established by the proposed START III Treaty, then France, the United Kingdom, and China will need to be involved in follow-on arms control discussions. In addition, future negotiations must address the issue of non-strategic nuclear weapons, which will grow in importance as the number of strategic weapons declines. Along these lines, panelists suggested that further arms control discussions beyond the traditional START framework should take into consideration the specifics of nuclear warhead destruction and the significant concerns regarding the current and future status of the Russian early warning system. In addition, continuing the transformation of the political relationship between the nuclear powers from conflict to cooperation is key to any future nuclear force reductions.

The fourth panel on *Chemical and Biological Weapons: Issues and Solutions*, focused mainly on the difficulties associated with controlling chemical and biological weapons, including lessons learned thus far in the CWC and their applicability to the BWC. It was also pointed out that states must give more attention to the criminalization of activities that facilitate the use or acquisition of chemical or biological weapons. With regard to the CWC, panel members noted that, despite the apparent success of the first year of CWC implementation, some data declarations are incomplete, and

greater strides in transparency must be made. The effectiveness of various traditional arms control measures in the BW environment was examined, leading to the conclusion that verification of BW activity is a nearly impossible task since the tools used for verification under the CWC will prove ineffective for a BWC. One method to stem BW proliferation is being exercised through the CTR Program via the engagement of former Soviet BW scientists in non-military cooperative endeavors.

Panel Five, *Arms Control and Regional Tensions*, consisted primarily of discussions concerning current and emerging tensions in Asia. Particular attention was given to the Korean Peninsula and the Indian-Pakistani relationship. With regard to the Korean Peninsula, it was suggested that commercial satellite technology could be used to monitor conventional forces to reduce the level of tension. One panelist asserted that the United States should adopt a policy of cooperation and reassurance rather than coercion with North Korea to remove the potential for military conflict. On the issue of the Indian-Pakistani situation, the main questions brought about by the recent nuclear tests concern the potential use of nuclear weapons in that region. It was proposed that the successful management of the situation was tied to specific factors which include internal domestic political stability and the steadiness of bilateral relations, as well as the nature of the arms race and the capability to maintain international stability during a crisis. From the proliferation perspective, panel members noted that third world countries lack a strong sense of ownership of the nuclear Nonproliferation Treaty (NPT) and the nonproliferation cause, and that the recent nuclear detonations have exacerbated the tensions between the nuclear "haves and have-nots." Finally, the United States must re-evaluate its sanc-

tions policy and develop credible, appropriate, and proportional response mechanisms to cope with current and emerging proliferation issues.

The sixth panel, *Emerging Arms Control Implementation Strategies: Institutional Perspectives*, addressed specific aspects of implementing arms control agreements. Panel members noted that over the past decade, an unprecedented number of arms control agreements and confidence-building measures have been reached, such as the CWC, the 93+2 Program, and the Dayton Peace Accord. These agreements have necessitated the creation of a diversified array of processes and institutions to comply with new obligations. Such institutions are represented by the On-Site Inspection Agency and the Organization for the Prohibition of Chemical Weapons. Cooperative arms control, together with collective defense efforts and verification, is and will remain, the centerpiece of cooperative security and stability. As the multinational nature of missions increases, there will be a greater need for the establishment of common international standards regarding the conduct of verification measures. Moreover, the amount of available information related to security and arms control will continue to increase due to additional obligations to provide information, new technologies, and enhanced cooperation. Finally, despite the increased use of technology, human interaction and on-site inspections remain the key to effective arms control implementation.

The final plenary session, a roundtable discussion on *Arms Control in the Revolutionary Era*, dealt with many of the issues raised in the earlier speeches and discussions and looked ahead to future threats and requirements. Panelists noted that significant near-term threats to U.S. national

security include the vulnerability of the U.S. information infrastructure; the deterioration of the U.S. nuclear deterrent; asymmetric threats such as loose nuclear warheads in the FSU; inadvertent or accidental launch of Russian missiles armed with nuclear or biological weapons; and a national security system overload arising from a combination of these threats. With regard to the recent Indian and Pakistani nuclear tests, it was pointed out that, while the full impact of the tests on arms control and nonproliferation has yet to be ascertained, it has become clear that new thinking on a range of related issues is warranted. Points to consider include the appropriate U.S. response to the tests, the U.S. relationship with the South Asian region, and U.S. nonproliferation policies in general. Several pertinent observations were made regarding various aspects of arms control in this emerging RMA environment. First, while new forms of arms control have already begun to play a significant role, traditional arms control that enables development of codes of conduct, ways of thinking, and international norms will continue to play a valuable role. Second, while it is indisputable that the RMA has significant implications for arms control, it is not yet clear to what extent these two domains will impact one another. Third, and finally, panel members observed that arms control – consisting of political, economic, diplomatic, and technological measures – is not a panacea for the dissolution of threats but must work in concert with nuclear deterrence and counterproliferation efforts.

A number of recurrent, overarching themes were raised during the conference. These include:

- The realities of the contemporary period have required modifications to arms control approaches relating to the concept of threat reduction. This new con-

cept, embodied in the Defense Threat Reduction Agency, rests on three pillars: maintenance of the U.S. nuclear deterrent, reduction of the threat from WMD, and countering the threats presented by WMD. The traditional concept of arms control and cooperative threat reduction form the basis of the second pillar and have a significant influence on the first and third of these pillars.

- Asymmetric threats – primarily from terrorists and states armed with WMD or the means for conducting cyber-warfare – to critical national infrastructures must be dealt with as seriously and with as much dedication as was the nuclear threat during the Cold War. This includes a greater role for multinational arms control, especially in its expanded, redefined context within the sphere of threat reduction. The proliferation of capabilities among non-state actors strongly affects the conduct and considerations involved in the arms control negotiation and implementation process.
- Nuclear weapons will remain a part of the international security scene for the foreseeable future with an expansion of the number of states that possess nuclear weapons. As a result, it is worthwhile to explore the benefits of establishing a joint U.S./Russian global monitoring system with the potential to extend participation to other nuclear powers in order to reduce the threat of preemptive, preventative, or accidental launch of a nuclear weapon.
- The current RMA proffers a two-edged sword with respect to arms control: Although the RMA may offer the prospect of greater transparency regarding another party's capabilities and possibly even intentions, it may also provide po-

tential adversaries with advanced technologies that can blunt or nullify U.S. capabilities. This is particularly true in areas driven primarily by advanced systems that are commercially available.

- The success of the RMA is heavily dependent on the concurrent revolution in business affairs in the commercial sector. The involvement of this sector in the development of advanced technologies both helps and hinders the implementation of arms control measures. While commercial firms often contribute the technologies to make arms control more effective, they also complicate the arms control process by adding a new layer of proprietary considerations.
- Arms control relating to strategic forces is heading away from the bilateral process that characterized the Cold War period. As a result, START III will almost certainly be the last bilateral arms control treaty concerning strategic forces. Agreements beyond START III will require the participation of other nuclear-weapons states in future regimes in order for them to be meaningful. However, Russia must ratify START II to clear the way for START III, and in doing so, propel further reductions in nuclear forces.
- The recent Indian and Pakistani nuclear tests are a manifestation both of the impact of technological proliferation and of the uncertainties and instabilities that characterize many longstanding regional disputes. Despite attempts by the United States and others to introduce arms control measures and concepts in a regional context, uncertainties and instabilities dominate, thus increasing the potential for the use of WMD between states. The international community must take steps

to support the tenets contained in the NPT and CTBT as the basis of nuclear nonproliferation, encourage the adoption of the NPT by India and Pakistan, and revitalize efforts promoting the ratification and implementation of CTBT on a global scale.

- The effectiveness of the CWC and the BWC is dependent upon robust verification regimes. The development of more discriminating inspection and monitoring technologies that strike a balance between enhanced intrusiveness and protecting U.S. national security and proprietary information is necessary. The judicious application of these technologies must be directed toward improving confidence in arms control treaty compliance.
- Although the magnitude and consequences of use of WMD are nowhere near the scale of a potential superpower clash during the Cold War, the probability that WMD could be used is much greater today. This presents those who are involved in arms control and other forms of threat reduction with a formidable set of challenges and the necessity for creating new means to reduce the likelihood of wars and terrorist acts, as well as to mitigate the effects if such use occurs.

The Eighth Annual International Conference on Controlling Arms will be held in Norfolk, Virginia, from 1 to 4 June 1999, and will be sponsored by the new Defense Threat Reduction Agency.

**KEYNOTE ADDRESS BY  
GENERAL JOHN M. SHALIKASHVILI, USA (RET)  
Former Chairman, Joint Chiefs of Staff**

Thank you, Major General Gary Curtin, for this introduction, and thank you for having brought all of us together here in Philadelphia for this Seventh Annual International Conference on Controlling Arms, to tackle this year a very important but so far little explored topic, the intersection of Arms Control and the Revolution in Military Affairs.

I am delighted to see so many of you here – and scanning your faces and the list of names of those scheduled to join us later – you couldn't ask for a better group to shed some very useful light on this very timely subject. By now the Defense Special Weapons Agency, like the Defense Nuclear Agency before it, has established a very well deserved reputation for providing just the right forum for experts from around the world to discuss all possible aspects of Arms Control.

But as an aside and by way of a commercial for my favorite Defense agency, the Defense Special Weapons Agency tackles a host of other subjects at similar gatherings with equal expertise. A perfect example of such expertise was a conference General Curtin and DSWA convened not long after terrorists attacked Khobar Tower, killing and wounding so many of our airmen.

At that time, Gen. Curtin brought together not only many of those considered most knowledgeable about terrorism but, most importantly, he also gathered representatives from those industries who were interested in finding innovative technical solutions to help us better protect our facil-

ities and our men and women from future terrorist attacks.

That conference helped considerably in our understanding of the whole field of anti-terrorism and particularly the specific steps that we and industry should and could take to improve the protection of our troops. And as one who has had a longstanding and deep interest in the subject of arms control at least since the Bush Administration, when Gen. Curtin and I spent much time in Russia working such problems as START II, Non-Strategic Nuclear Force Reductions, and the early stages of what we now call Cooperative Threat Reduction, and as one with an equally deep interest in the possibilities of the Revolution in Military Affairs, I am delighted with the selection of this topic for our conference. I have no doubt that with your participation this conference will be every bit as productive and as helpful to our policy makers and defense planners as they prepare the arms control agenda for the coming months and years, as was the conference on terrorism for our operators as they prepared for possible future terrorist attacks.

Now it is hardly possible to begin such an important conference on arms control without noting with a great deal of disappointment that two major arms control treaties are facing, at least temporarily, an uncertain future: The Comprehensive Test Ban Treaty, thanks to most regrettable actions taken by the governments of India and Pakistan, and START II, because of a most regrettable lack of action by the Russian Duma. I don't have to tell this distinguished gathering just how important these two ma-

major treaties are to the security of our nation and indeed the stability and security of the world. So it is critical – now more than before – to avoid, in concert with others, any possible missteps.

In the case of the Comprehensive Test Ban Treaty, it is important for the Administration and for Congress to be clear that despite India's and Pakistan's regrettable actions, the treaty remains in the best security interest of everyone – and certainly the United States. While sanctions must remain in place, on the other hand, we must avoid isolating India or Pakistan, but rather must redouble our efforts to keep either of them from mating their nuclear devices to their missiles. At the same time, sooner rather than later we must help them look for alternatives that would make it attractive for both to become signatories to the CTBT. It is critical to cool the temperature just as soon as possible. The animosity between the two is too great – and the possibility of armed conflict too real – for us and the world not to try everything possible while there is still a chance to keep the Indian subcontinent free of nuclear weapons.

In the case of START II the issue, of course, is less alarming. Nevertheless, the Yeltsin government and the Russian military must be urged to continue to press the case with the Duma that the way to START III, which most Russians and most in the Duma would like to see, can be reached only through START II. And on that we should not waver, for success of future US-Russia negotiations depends on that. But we also have to be clear that as soon as START II is ratified, the United States will be prepared to move to START III negotiations at levels we agreed upon at Helsinki. At every opportunity we must reinforce the fact that failure by the Duma to ratify START II will have vastly more disadvantageous results for

Russia than for the United States, but that we both will win if together we can go to START III levels.

Now, having started with what is clearly not so good news for the arms control agenda, it is very important to make the point that despite these setbacks, arms control remains a very useful and indeed a very critical national security tool. For without arms control the world would be a lot less stable and a lot more dangerous, and we would be paying a lot more for considerably less security. And because these advantages of "prudent" arms control are so well recognized for years now, arms control has been an integral part of the security policy of successive administrations of both parties, and I am convinced it should and will remain so, our troubles with the CTBT and START II notwithstanding.

If anything, in the future, arms control is likely to be viewed in an even broader and deeper sense, branching out beyond controlling "quantity" to addressing ever more the "quality" of systems or concepts we might wish to control. It is particularly in that context that we must understand its interaction with the Revolution in Military Affairs. For what we now call the Revolution in Military Affairs is every bit as important to our nation's security, and it is certainly here to stay as well.

In Operation Desert Storm, the image of Stealth fighters, flying untouched through Iraqi defenses, precision-guided bombs flying down chimneys, and cruise missiles silently streaking towards their pre-programmed targets first awakened the world to the probability that we were again on the cusp of another Revolution in Military Affairs. Like the revolutions that brought us airpower, the blitzkrieg (mobile armored warfare supported by air power),



and strategic nuclear forces, this revolution – based largely on information technologies – the world sensed this new revolution also had the potential to exert a profound influence on warfare at every level.

Now, seven and a half years after watching those dramatic pictures on television, we know that the possibilities are even greater. Yet surprisingly little if anything has been written explicitly on the application of the Revolution in Military Affairs to arms control. Since both are so inextricably linked to our nation's security, it is high time, therefore, that we meet here to see how we could advance our understanding of this relationship. Yet because such a discussion will be heavily influenced by how we view and define "arms control" and what we understand the "Revolution in Military Affairs" actually to be, let me offer you some thoughts on both.

First, on the objective of arms control – for I'm not always certain there is a common understanding why we pursue arms control. And occasionally, critics of arms control accuse some in and out of government of pursuing arms control for the sake of controlling arms, as if that were the desired end. You, of course, understand that this is not so. We engage in arms control to help make our nation – and by extension the world – a safer and more secure place in which to live. And we do that principally by reducing or eliminating arms or systems that are either destabilizing in themselves (like "use or lose" first strike strategic systems) or their presence in large numbers would be destabilizing (a reason for the CFE treaty), for instance. We also seek to increase safety and security by eliminating weapons which are particularly inhumane, such as chemical or biological weapons on the one side, and dum-dum bullets on the other. And we certainly seek to limit and eliminate classes of

weapons, like nuclear weapons whose destructive power is so overwhelming that their use could prove catastrophic to mankind.

There are, of course, other reasons, but my point is that while the objectives of arms control and the reasons we control arms are in my view relatively narrow, I would suggest that in this conference we take a rather broad and more inclusive view of the methods of controlling arms. Specifically, I suggest that we think of arms control not only as encompassing classic or traditional treaty based regimes, but also, all sorts of transparency schemes, different and innovative confidence building measures, the whole field of proliferation prevention, Cooperative Threat Reduction, and even such regimes as export control and perhaps, even, methods of preventing terrorism, particularly terrorists' use of weapons of mass destruction. Now, if one accepts the regimes or methods of arms control to be as broad as I have just suggested, then from such a broad view flow more varied and more demanding information gathering and processing requirements, which is perhaps the first linkage between arms control and information-based technologies of the Revolution in Military Affairs.

Let me make some observations about the RMA. First, let me suggest that the Revolution in Military Affairs is more than just the application of advanced information processing technologies to gain vastly increased knowledge of the battle space. It is certainly that, but it is more. To be revolutionary and have a "profound" influence on combat operations, you must not only possess revolutionary awareness of what is occurring all around you, but must also possess revolutionary ways to do something about that of which you have become aware, while at the same time providing for our

own forces what *Joint Vision 2010* calls “Full Dimensional Protection.” That is, denying your adversary the battle space knowledge you have acquired and denying him the opportunity to attack you through electronic or physical means.

Extraordinary advances in micro-electronics, electro optics, satellites, unmanned aerial vehicles, and remote sensors are sweeping aside the fog over the battlefield and are permitting commanders to see deep into the enemy’s territory with a clarity unimaginable even during Desert Storm. Complementing these developments, remarkable progress in information technology, computers, and system integration will allow us to process, analyze, and distribute vast amounts of information all over the battlefield. And advanced stealthy platforms and well protected units, using very long range and extremely precise munitions, will be able to strike anywhere in the battle space – literally – from beyond the effectiveness of enemy defensive systems.

This (new) Revolution in Military Affairs is thus a marriage between dominant battle space awareness – extremely precise deep strike capabilities – and advanced low observable technologies. And both – the Revolution in Military Affairs and arms control – have a potential to significantly increase our safety and security, but only if we understand the impact of one upon the other. If we don’t, we are in danger of considerably marginalizing the advantages of one or the other, or worse yet, marginalizing our security.

That said, let me suggest to you that there are at least three aspects of the relationship between arms control and the Revolution in Military Affairs that stand out at first glance and are worth exploring: First, the impact of arms control on the

Revolution in Military Affairs; secondly, the impact of the Revolution in Military Affairs on the process of controlling arms; and thirdly, the impact of the RMA on the substance of arms control. Here are some random thoughts for your consideration.

First, on the possible impact of arms control on the Revolution in Military Affairs: Most obvious, of course, is the potential for arms control to constrain our developments and deployments of RMA-based systems, weapons, and concepts, thus potentially hampering our ability to fully dominate the battle space and, as much as we might have been able to otherwise, to safeguard our troops. Less capable RMA might, of course, also yield less deterrence in the first place.

National policy makers and defense planners will need a thorough understanding of both arms control and the RMA if they are to make wise decisions where RMA development or arms control progress is to dominate. And for them, the problem will be in identifying which factors and trade-offs are critical, given the uncertain origin and asymmetric nature of future threats. The flipside, of course, could be that arms control could prove useful in constraining the fielding and employment of certain capabilities which in the hands of potential adversaries might, on balance, be more harmful to us than like technologies in our own hands would benefit us.

This is, I submit, a real-world problem, for although the US leads in RMA development, the RMA is essentially a worldwide phenomenon. Thus, other countries, some hostile, will benefit from many of the same technologies and concepts, especially because they are not unique to the military sector but are widely available commercially. Just reflect: Advanced computing

equipment, sophisticated encryption systems, a vast array of the most advanced communications systems, even space-based systems and geo-positioning capabilities are all readily available on the international market to an enterprising nation.

These technologies offer potential enemies capabilities not just to mirror us but also to carry out asymmetric attacks on US information systems and infrastructure that can cause great damage or at least costly interruptions. On the other hand, arms control may have a potential role in ameliorating some of the problems arising from the global aspect of the RMA. For example, an enforceable missile technology export control regime would help protect our space-based communications, navigation, and reconnaissance infrastructure.

But how about the impact of the RMA on the process of controlling arms? For instance, what are the opportunities to apply RMA-related technologies and techniques to the information gathering and information processing requirements of arms control verification regimes? This is an issue that will become even more important and more complex – as we begin to move from controlling mainly the “quantity” of systems or weapons, something relatively easy to keep track of, to the “qualitative” aspects of arms control.

Also, it is reasonable to expect that the RMA concept of dominant battle-space awareness can, I submit, be transformed conceptually into arms control transparency by applying the same tools we would to support combat operations: sensors (and pertinent intelligence/reconnaissance collection means); communications; data processing, fusion and distribution; and various decision aids. For as in combat, RMA concepts applied to arms control monitoring and

verification should be based on improved situational awareness, decreased response time, and making the area under consideration – the arms control equivalent of the battle space – more transparent.

Clearly, the RMA capabilities applied to controlling arms can provide a significant increase in “transparency” and “confidence” and, thus, we should be able to engage in arms control more confidently and even with the potential of acting within a violator’s decision time cycle. It is even highly likely that new RMA-type technologies will make it possible to open up new avenues to controlling arms, avenues up to now too difficult to verify.

Well, finally, some thoughts on the impact of the RMA not just on the process of controlling arms, but rather on the substance of arms control. One of the issues that deserves exploration is the potential implication of RMA-related technologies and systems for arms race stability and crisis management. It’s the old song. For instance, a potential rival may develop similar or countervailing capabilities, thus creating a high-tech arms spiral. Or superior sensor and information processing capability on one side could create the incentive to preempt in an asymmetric attack by the inferior side against, let’s say, a satellite earth station.

The question is simply this: Could a commitment to deploy the RMA fuel an arms race with the net effect over time of lowering one’s security, or is there always an advantage to the side that harnesses and applies the RMA? At the beginning of the nuclear age, most would have been convinced the answer was in favor of possessing nuclear arms. Now we are no longer so sure. We ought to at least ask that question at the beginning of this RMA age.

In a totally different vein, one of the key operational concepts of *Joint Vision 2010*, “full dimensional protection,” is especially pertinent to the impact of the RMA on the substance of controlling arms.

The requirement for a multi-tiered missile defense architecture, exploiting RMA-type technologies, has implications for the ABM Treaty, START I and II, and efforts to control the proliferation of missile technology. Yet it seems obvious that by addressing chemical, biological, and nuclear proliferation, arms control can contribute significantly to “full dimensional protection” by removing at least some of the burden from the detection and protection tasks that we would otherwise have.

So what can we make of all of this? Well, arms control and the Revolution in Military Affairs are both here to stay, for they both have the potential to significantly contribute to our nation’s safety and security. Yet we need to learn more about the impact of one upon the other. However, even with our limited understanding, it nevertheless seems clear that our challenge will be to insure that future arms control proposals try to anticipate potential RMA developments and not inadvertently constrain future RMA capabilities. On the other hand, arms control wisely applied has the potential to make certain RMA tasks easier and to perhaps fill holes that RMA technologies might be unable or ill-suited to cover. And almost certainly, RMA information technologies promise to make arms control verification and control easier and even promise to open up new possibilities for arms control up to now too difficult to verify or control.

Finally, after a number of years with the interagency and having been involved in many arms control issues, I know how important it will prove to policy makers and

defense officials to have a deeper understanding of the relationship between arms control and the RMA and a more detailed knowledge of RMA technologies and their military application. And the process would certainly benefit, if we could find a practical way, to get such information to more members of Congress where, after all, all treaties must go for Senate ratification.

This conference can make a major contribution by starting this process. Now, with that I should let you go to work. Thank you for your attention and have a great conference.

# PLENARY 1

## ARMS CONTROL AND THE REVOLUTION IN MILITARY AFFAIRS: IMPLICATIONS FOR DEFENSE PLANNING

Chair

**Vice Admiral Dennis C. Blair, USN**  
Director, Joint Staff

**Captain Joseph E. Enright, USN**  
Director, Combat Plans, and Deputy  
Director, Plans & Policy,  
U.S. Strategic Command

**Brigadier General Thomas F. Gioconda, USAF**  
Principal Deputy Assistant Secretary for  
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**Rear Admiral Michael D. Malone, USN**  
Deputy Director, Plans & Policy,  
U.S. European Command

**Dr. George R. Schneider**  
Director, Strategic & Tactical Systems,  
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### Introduction

From the perspective of defense planners, the current environment is dominated by the ongoing Revolution in Military Affairs (RMA), with its emphasis on the development of technologies to advance the concepts espoused in *Joint Vision 2010*. The Joint Chiefs of Staff published this 1997 warfighting vision statement to define the way U.S. armed forces will prepare, fight, and triumph in future military operations. The main focus of *Joint Vision 2010* is on achieving dominance across the range of military operations by applying new warfighting concepts such as accurate battlefield assessment, stealth, precision strike, and full-dimensional protection. This strategy emphasizes conventional warfare with low collateral damage resulting in a decisive victory. *Joint Vision 2010* discusses the incorporation of technology into the national security strategy primarily from the offensive side. Weapons of Mass Destruction

(WMD) will play a reduced role in the Department of Defense's (DoD) offensive security strategy, although the United States reserves the right to respond to an unconventional attack with any available resource.

The rapid technology advancements represented by the RMA have the potential to impact traditional arms control methods in a myriad of ways. Rather than overshadowing traditional arms control, however, the RMA can extend the already powerful tools and capabilities available to defense planners. In this session, defense planners elaborated on future arms control and RMA efforts, and how they should be used to complement *Joint Vision 2010*.

### Benefits and Vulnerabilities of the RMA

The fulfillment of the *Joint Vision 2010* concept greatly depends upon the technological advancements driving the current RMA. As described by one panelist,

*Joint Vision 2010* calls for the use of advanced technology to provide U.S. troops with exceptional knowledge of battlefield conditions, the state of enemy forces, and the state of their own forces. Technology will also be used to allow the United States to execute rapid, relentless attacks against opponents to win battles quickly and decisively, while minimizing civilian casualties. Full-dimensional protection and military superiority based on the skill and training of U.S. soldiers are additional aspects of this concept.

As the RMA is gradually implemented, leap-ahead information technologies for the “digital battlefield” are gaining importance. Development of a strong command, control, communication, computers, intelligence, surveillance, and reconnaissance (C4ISR) capability is particularly important for networking joint defensive systems in the current environment. Another major technology development effort, brought about in part by the RMA, is the National Missile Defense (NMD) program. Although the deployment status of an NMD system is unsettled, defense planners generally believe that the “3+3 Standard” (3 years to detect a threat being developed and 3 years to deploy a counter to that threat) adequately addresses the current situation.

The RMA is an area where the United States has an inherent advantage over other states, contended one panelist. United States forces rely heavily on information technology systems tools, which contribute a great deal to the effectiveness and flexibility of the U.S. military. However, this reliance has also created certain vulnerabilities. For example, the security of U.S. information systems has become an issue because of the large number of computer hackers seeking unauthorized access to the sensitive information contained within the system. The

United States has been developing tactics for identifying and stopping computer hackers, and has enjoyed some success in this area. These tactics and the nature of the information technology itself provide a self-checking system to identify weaknesses and opportunities associated with technology.

Another vulnerability associated with the RMA results from the fact that military requirements are no longer the major force driving technological advancements. According to one member of the panel, because of the RMA’s heavy reliance on the ongoing revolution in business affairs to drive the pace of change, the military is not in a position to control or direct technological advancement, or to limit the number of beneficiaries. With the end of the Cold War and the accompanying diminution of the security threat, DoD is no longer the first among equals. Rather, it must engage in a fierce competition for resources and influence with other government agencies, and it must protect its interests against the competing interests of other sectors. Several technologies originally developed for use by the military, such as the global positioning system, modeling and simulation techniques, and encryption codes, are now being used extensively in the civilian sector. This sharing of technology has important implications for national security and arms control because it contributes significant capabilities and tools to the civilian sector.

### **Arms Control Concerns for the Defense Planner**

Defense planners perceive nuclear arms control to be a positive reinforcement of nuclear deterrence that has led to greater stability and security on a global scale. However, in the current environment, DoD is grappling with how to apply traditional arms control approaches to new security

scenarios using RMA capabilities. According to one panelist, arms control agreements can be characterized as both either “hard” or “soft.” “Hard” arms control measures have instituted limits on the types of equipment, qualitative improvements on equipment, and the type of allowable testing; while “soft” arms control consists of confidence and security building measures, demonstrations of new equipment, data exchange, and other transparency measures. The RMA is resulting in the creation of new classes of weapons such as unmanned aerial vehicles and anti-satellite weapons that are not covered by either type of arms control measures. This situation is further complicated by the RMA because treaty negotiations that do target newer areas often last so long that the final agreement produced by those negotiations runs the risk of being outpaced by technology. Concurrently, existing arms control agreements are in danger of becoming irrelevant by the development and proliferation of new capabilities. The issue of how to account for advances in technology has been particularly challenging for defense planners and has required sophisticated planning and strategizing to demonstrate how weapons and policies would be affected by proposed arms control measures.

In addition to the disparity between the negotiation, adoption, and implementation of arms control measures and the pace of technological advancements, a disparity exists between the arms control community and the defense planning community regarding confidence in the various arms control measures and their associated verification regimes. Specifically, while the arms control community is pushing for the adoption of new and expanded arms control regimes, defense planners are concerned that the verification measures contained in these regimes may not be adequate and that there is a need to develop protective measures in

the event that arms control agreements are violated. One example of such a measure is the recent decision to vaccinate all U.S. military personnel against anthrax.

Defense planners are also concerned that arms control is driving security strategy rather than the preferred reverse situation. Furthermore, in the current environment, Non-Governmental Organizations (NGOs) are increasingly competing with defense planners for influence over the arms control agenda. This situation is a cause for concern because of the potential for humanitarian interests to take primacy over security concerns. For example, the recent effort to ban the use of anti-personnel landmines (APL) was spearheaded by humanitarian NGOs and resulted in the adoption of an international treaty that contains no verification or enforcement measures. In the opinion of one panelist, the APL Treaty is also premature because it discards an established defense mechanism without providing a viable substitute. Furthermore, there is the strong potential that countries that still use landmines will ignore this treaty. As a result, in spite of an international APL agreement, the U.S. military must continue to plan to counter landmines used by countries that are not party to the treaty.

The primacy of humanitarian interests over security concerns is also exemplified by the Kyoto Protocol. Environmental NGOs spearheaded this international measure designed to limit emissions, reduce greenhouse gases, and protect the environment. However, this measure has the potential to limit U.S. force maneuverability during wartime and training missions, an issue that was overlooked during negotiations. As national security concerns continue to compete with other priorities, one panelist asserted that DoD must pay closer attention to activities beyond its immediate

realm that may restrict its capabilities, make extraneous claims on its resources, and alter the execution of war plans.

### **The Future of US-Russian Bilateral Strategic Arms Control**

Regarding the future of the Strategic Arms Reduction (START) II Treaty, one panelist remarked that it is too dangerous for the United States to make unilateral cuts to its nuclear force without parallel actions taken by the Russians. He argued that this type of action would set a negative precedent for future negotiations between the two countries and recommended that the United States persevere in its support for the ratification of the START II Treaty by the Russian Duma. If ratification does not occur in a timely manner, the United States should continue to work with Russia to further develop its partnership and to reduce the strategic threat in other ways. Current bilateral measures such as limited information sharing and visits to military facilities have been shown to have great value to the U.S. military and scientific communities, and a great deal of valuable knowledge is gained through these exchanges. In addition, such exchanges have resulted in strengthening and diversifying U.S.-Russian relations at the working level.

Regardless of the outcome of START II, START III is likely to be the last bilateral arms control treaty negotiated by the United States using the traditional negotiation approach. Further reductions in the level of strategic nuclear weapons are expected to necessitate a rethinking of national security, deterrence strategy, and strategic arms control. In addition, many in the arms control and defense planning communities believe that future arms control treaties will require the participation of other nuclear powers, according to the panelist.

### **Stockpile Stewardship**

Even with the implementation of important arms control measures, nuclear weapons will continue to underpin U.S. security strategy into the foreseeable future, regardless of the fact that the United States has halted the production of new weapons and ceased underground testing. One member of the panel described how the Department of Energy (DOE) has responded to the challenge of maintaining the viability of the aging U.S. nuclear stockpile without the use of underground tests by initiating the science-based stockpile stewardship program. This program is working to maintain a credible nuclear deterrent using cutting-edge scientific and information technology. Implementation of the stockpile stewardship program requires a major contribution from the national laboratories, specifically in the areas of modeling and simulation, to maintain the stockpile in the absence of testing a nuclear explosive yield. DOE is required to certify the reliability of the nuclear stockpile on an annual basis using data obtained through the stockpile stewardship program. While the funding for the stockpile stewardship program is currently stable, it will require a dedicated effort in the future to maintain this budget. That effort will necessitate moving beyond a Cold War mentality while remembering the relevant precepts from that period, and attracting a new generation of scientists in order to ensure the maintenance of necessary scientific tools.

### **Summary**

While maintenance of nuclear deterrence continues to be reinforced through the evolving concept of arms control, technology developments occurring under the RMA present a variety of challenges to the future of arms control. The RMA is vital to achieving the objectives spelled out in *Joint*



*Vision 2010.* In addition, the successful implementation of the stockpile stewardship program is dependent on the RMA to provide the cutting-edge scientific and information technologies to maintain the credibility of the U.S. nuclear deterrent in the absence of underground nuclear testing.

Concurrently, the reliance on leap-ahead information technologies being developed for the digital battlefield has created new vulnerabilities, especially in the area of command, control, and communications. The RMA's dependence on the revolution in business affairs means that defense planners have less control in directing or limiting access to technological advancements. This has resulted in concerns that external factors are having a much greater impact on national security strategy. As a consequence, closer attention must be paid to activities beyond the immediate defense-planning realm that may restrict capabilities, make claims on resources, and alter the execution of war plans. DoD is also grappling with how to apply traditional arms control approaches to new security scenarios and is using sophisticated planning and decision techniques to understand how the weapons and policies of tomorrow will affect current and future arms control measures. Within this context, existing negotiated reductions must be fully implemented through the ratification of START II in order for further progress to be made toward the conclusion of a START III Treaty. START III will be the last bilateral nuclear treaty because future nuclear treaties will stipulate reductions at levels that will likely require the participation of the other nuclear-weapons states.

The RMA and its effect on arms control are of major interest for several reasons. First, technology sharing between the military and civilian sectors has important implications for national security and arms

control because it contributes significant capabilities and tools to the civilian sector. In addition, the RMA is resulting in the creation of new classes of weapons that are not covered by arms control measures. One potential outcome of this is that current arms control agreements run the risk of becoming irrelevant by the development and proliferation of new capabilities. Furthermore, treaty negotiations often last so long that the final agreement has the potential to be outpaced by technology. Finally, concerns have been raised regarding the adequacy of current verification regimes for guaranteeing full compliance with arms control treaties, a situation which is being further exacerbated by the diffusion of more complicated technologies.



**LUNCHEON SPEECH BY  
SENATOR SAM NUNN  
Senior Partner, King & Spalding**

Thank you, General Curtin – General Shali – Admiral Macke – Distinguished guests. My central point to this gathering of experts today is as follows: As we discuss, debate and evaluate our revolution in military affairs, don't we also need to begin a revolution in our thinking on arms control – both in concept and definition? Let me begin by giving you a simple quiz: Are these scenarios real or fictional:

Scenario 1. An important region declares independence, claims ownership over the nuclear forces stationed on its territory, and requires nuclear commanders to swear allegiance to the new state. The Russian General Staff kicks into high gear, dispatching caravans of special trucks and trains to retrieve thousands of tactical nuclear weapons from the breakaway region and transporting them to storage facilities in a more secure region of Russia. It also prepares for the cumbersome task of deactivating strategic nuclear missiles in the new republic and moving their warheads back home.

The new state, however, thwarts the Russian effort. Its militia surrounds the nuclear weapons sites and blocks access to the highways and railways leading out of the country, preventing Russia's elite nuclear weapons custodians from moving their cargo. Meanwhile, the new regime undertakes preparations for seizing control of strategic missile forces. The Russian General Staff alone holds the special unlock codes needed to fire the missiles, but the locking devices are actually built in the breakaway state, and given time, it could simply install and code its own devices. The

Russian military estimates these steps could be completed in a few weeks, at which time it would lose launch control over these missiles unless it acted quickly to sabotage the installations or regain physical control through large-scale military intervention. Real or fiction?

Scenario 2. Disloyal political and military figures topple the existing Soviet regime placing the President under house arrest. The conspirators include the defense minister, head of the federal intelligence branch, chief of the General Staff, and a group of hard line nationalist politicians. The coup plotters declare a nuclear alert for all forces. The launch codes remain in the hands of the military, but the political turbulence splinters the military. The chain of nuclear command is broken, compromised, and confused. Real or fiction?

Scenario 3. Troubling blips suddenly appear on the screens at radar sites across northern Russia. One or more missiles apparently have been launched from an area of the Norwegian Sea known to be routinely inhabited by U.S. and British strategic submarines capable of hitting Moscow with hundreds of nuclear warheads in 15 minutes. The early warning center flashes a missile attack warning to the Russian president and his top nuclear advisors. The General Staff alerts the missile commanders across Russia to begin launch preparations. A countdown to impact begins as the radars and satellites continue to track the trajectory of the threatening objects. Russia's main retaliatory option calls for the President deciding whether or not to launch no later than ten minutes after an enemy missile attack. Two minutes

before the deadline for rendering the fateful decision, the senior duty officer at the warning center informs Russia's President that the missiles' flight path appears to pose no threat to Russia after all. Days later, the Russians find a misplaced U.S. notification of a satellite launch. Real or fiction?

Scenario 4. A computer hacker who called himself the "Phantom Dialer" seizes control of important computer networks around the world – at universities, corporations, banks, federal agencies and military facilities – including top secret weapon research sites. As the FBI computer crime squad launches a major investigation, questions and speculation are rampant. Is the hacker a spy, a foreign agent, a saboteur or a thief? When law enforcement finally burst into the Phantom Dialer's house in Portland, Oregon, they find a 20-year old youth, severely brain damaged by viral hepatitis. He lives with his father and his bedroom is littered with piles of paper, mounds of dirty laundry, rotting food and lumps of dog feces.

His fingers are gnarled like an old man from typing on the computer 20 hours a day. The lenses on his glasses are covered with fingerprints, oil and dirt, and by the pungent odor, it is clear that he had not taken a shower for weeks. It is clear to the arresting officer that no jury in the country would convict a socially, mentally and physically handicapped kid for sophisticated computer crimes. The decision is made by the FBI not to prosecute, but instead, to keep the story quiet. Real or fiction?

Scenario 5. Two hackers (Datstream Cowboy and Kuji) go through computer systems at sites in Asia, South America, Mexico and Latvia before gaining "root control" of the computer system at the U.S. Air Force Rome Laboratory, and from there,

launching successful penetration at businesses and government facilities in America and around the world, including the South Korean nuclear agency. Real or fiction?

Scenario 6. Libya decides after Desert Storm that the U.S. is too sophisticated and powerful to confront, even with chemical, nuclear or biological weapons. The Libyan Intelligence Agency begins a high priority interview process with young people who have computer skills. By early 1992, the Libyan Intelligence community has chosen 25 of their best and brightest computer geniuses and given them an assignment – carefully and methodically analyze the critical components of the U.S. economy, including telecommunications, energy, finance, transportation and emergency services, for their vulnerability to cyber attack. Give us a quarterly report on your ability to plant computer germs, confuse, interrupt and/or bring down computers and key nodes controlling America's critical infrastructure by city or by region. You will be given all the resources you need. The future of Libya depends on your skills. You must be ready to implement your plan by the year 2000. Real or fiction?

Scenario 7. With help from insiders, a criminal organization breaches the physical security for small tactical nuclear weapons and spirits them out of Russia selling them to terrorists supported by Libya and Iran. Meanwhile, unpaid personnel within Russia's sprawling complex of facilities run by the Ministry of Atomic Energy succumb to temptation and sell weapons-grade fissile materials to a criminal organization. A nuclear bomb is smuggled into a U.S. city and another one is on the way. Real or fiction?

Scenario 8. Two countries, with extreme religious and historical animosity,

who have fought three recent wars, explode nuclear tests within days of each other. Neither has weapons which could survive a nuclear first strike. Neither has a sophisticated warning system. Neither has fail safe procedures or PAL devices. Neither has adequate command control or communications. They have a low level civil war going on over disputed territory. Both frequently accuse the other of terrorist attacks. A bomb goes off in a train killing many innocent people.

During this period of increased tension, a top General reports to the Prime Minister, "Our human sources tell us an attack against our nuclear facilities is imminent. Our top military leaders are unanimous, Mr. Prime Minister. We must launch a defensive nuclear attack against them now or lose our weapons and our nation." Real or fiction?

The answers: Scenarios 1, 2, 3, 4\*, and 5 have already occurred. [\* From *At Large*, by D. Freedman and C. Mann] To the best of my present knowledge, Scenarios 6 and 7 are figments of my imagination. Scenario 8 is unfolding before our eyes each day.

My message – Our world has changed – we must think anew. Today, interconnected vital national functions such as telecommunications, energy, pipelines, transportation, finance and emergency human services – all accessible through public computer networks – provide a target-rich environment for terrorists, criminals, pranksters, malicious hackers as well as sophisticated state-directed computer experts.

The United States, indeed the world, is currently undergoing not only a military revolution, but a threat revolution. Both are related to the information revolution, which

poses an extraordinary set of new opportunities and challenges. My main point today – with the world changing all around us, we must think out of the box. A few assertions and then I will close by posing a few more difficult questions for this audience, filled with top leaders and experts.

First, the world has never before had an empire collapse still containing over 30,000 nuclear weapons, tons of chemical and biological weapons, thousands of missiles, and scientists who know how to make these weapons, but don't know how to feed their families.

Thanks to many in this room, we have made amazing progress with the Cooperative Threat Reduction program in preventing three of four successor states with fingers on the trigger from retaining their nuclear weapons. We have made great progress in helping to destroy thousands of missiles and bombers, in dismantling thousands of warheads and in helping Russia and other successor states begin to more accurately safeguard, transport, inventory and account for their warheads and their nuclear materials. As you know, this program is revolutionary in concept and implementation, but political developments here or in Russia could disrupt it with short warning. We have miles to go before we sleep.

Today, the biggest threat to U.S. fundamental security interest is not based on Russia's strength, but on Russia's weakness now combined with their missiles and their nuclear, chemical and biological arsenals, materials and know how.

Consider: Russia's loss of empire, their demoralized conventional military forces, their humiliations in Afghanistan and Chechnya, their lack of pay and housing for their troops, their eroding warning systems,

including radar and satellites, and their increased reliance on nuclear forces and early launch – all add up to an entirely different kind of threat to the U.S. and to them. I believe that it is time for both the U.S. and Russia to think far beyond Start II and even Start III. While we must improve, expand and accelerate the Nunn-Lugar program and the Nunn-Lugar-Domenici program and we must also think beyond these programs.

Before getting to my "thinking anew" questions, let me strongly endorse the findings and recommendations of the Marsh Commission on Infrastructure Protection and President Clinton's recent Directive. Our critical infrastructure is owned by the private sector, but can only be protected by a public/private partnership based on dialogue, coordination, cooperation and information sharing. A few critical steps must be taken by our federal government in the immediate future:

1. The federal government must get its own house in order on the Year 2000 problem.
2. The federal government and the private sector must reach a balanced, sensible approach to encryption. (Condition precedent to building trust.)
3. Legal obstacles to public/private information sharing must be removed – which means the President and Congress must lead.
4. An awareness and national education effort must be launched.

Cyber attacks and terrorist attacks using weapons of mass destruction have some important attributes in common:

1. It is difficult to identify and locate the origin of the attack.
2. It is likely that there will not be prior warning.
3. Attempts to deter will be extremely difficult because of the problem of identifying a perpetrator with a return address.
4. The attack may be disruptive or damaging not just in the actual physical damage, but in diminishing confidence in our government, our economy and our constitutional protections.
5. The first challenge for government and industry is to prevent attacks but also to prepare and train for managing the crisis and mitigating the consequences. Our frontline response teams, whether police, fire and emergency medical personnel or corporate information managers and law enforcement officials, must be prepared and equipped and must examine and practice – in advance – scenarios, options and operational plans.

The new Defense Threat Reduction Agency is being created at an opportune time to take the lead in addressing these vital security issues in this new revolutionary era.

Before closing, let me throw out a few more difficult questions for our experts to ponder:

1. Is the operational soundness of Russia's warning system as important to America's security as our own? Should we propose a cooperative program with Russia for a joint ballistic missile and aircraft warning and tracking system providing worldwide coverage not only of U.S. or Russian launches, but also third country missile launches? Should

we visualize including China, Britain and France at some point down the road?

2. Should we offer to both India and Pakistan a jointly manned center for early warning of missile launch using our detection satellites and our radars on Aegis-equipped ships in the Indian Ocean? Should this proposal, if made, be conditioned on both countries pledging to take verifiable steps to assure the world that nuclear weapons are not being deployed? Should we ask Russia to join in this proposal with Russia's own missile warning radar providing partial coverage of both India and Pakistan? Should we design this concept so that it could include China in the future?
3. Should we propose to Russia joint/mutual and verifiable measures to de-alert warheads to reduce the danger of accidental or unauthorized launch? Can we develop de-alerting measures that are affordable to Russia and that can be used as interim measures while we are both building down to START II and hopefully START III levels? As confidence develops over a period of time, can we go further by de-alerting most warheads on both sides, so that any large launch would require days of preparation?
4. Does Russia have a Year 2000 problem? Does it affect their missiles or the safety of their nuclear arsenal? Does it affect their energy producing nuclear power plants? Are they addressing these problems? Do they need help? How is our national security affected? The same questions should be posed for China, Britain and France and indeed for all commercial reactors.
5. Can Russia today accurately detect the origin of a third country or terrorist use of a nuclear weapon against its territory? Can we? Will the Russians know that the attack did not come from the U.S.? Should we consider expanding the present (primarily data exchange) risk reduction centers to include a team of U.S. and Russian military experts working together full-time to prevent proliferation and to prepare and plan for a coordinated reaction to third countries or terrorist use or threats to use nuclear, chemical or biological weapons?
6. Should we develop a parallel U.S./Russian law enforcement center to develop ways and means of cooperating on criminal and terrorist attempts to acquire or sell weapons of mass destruction?
7. What is our assessment of the risk of Russia's weapon grade plutonium stockpile and highly enriched uranium? Given Russia's economic distress, is this stockpile at high risk? If so, do our national leaders and Russia's leaders fully understand the third country and terrorist dangers? Should a joint program to bury, burn or buy plutonium taken from weapons assume a much higher priority in terms of our focus and our resources, as well as the expenditure of political capital by our elected leaders?
8. How can we link up international law enforcement to deal with the cyber threat? How do we deal with the "instruction manuals" increasingly available on the Internet, providing "how to" lists on constructing weapons of mass destruction and carrying out cyber attacks? How do we use market forces like liability insurance to give our private sector the incentive to pursue vigorous

information security efforts? How do we share classified threat assessments with those in the private sector who need to know?

You will undoubtedly think of many more profound and productive questions. I conclude where I began – we must think out of the box – we must think anew. As I leave these questions for you to ponder, I urge you to use your knowledge and wisdom to think anew.



## **PANEL 1**

### **TECHNOLOGICAL PROLIFERATION AND ARMS CONTROL**

Chair:

**Dr. Paula Scalingi**

Director, Decision and Information Sciences Division  
Argonne National Laboratory

**Mr. John Lauder**

Special Assistant to the Director of Central  
Intelligence for Nonproliferation,  
Central Intelligence Agency

**Mr. Bruce W. MacDonald**

Assistant Director, White House Office of  
Science & Technology Policy

**Dr. George Menas**

Assistant Director for Policy Planning,  
Defense Technology Security  
Administration

**Colonel Thomas D. Miller, USAF**

Chief, National Security Policy Division  
Nuclear & Counterproliferation Directorate,  
Headquarters, U.S. Air Force

**Mr. Robert Waldron**

Director, Office of Research &  
Development, Office of Nonproliferation &  
National Security, Department of Energy

#### **Introduction**

The success of the Allied coalition led by the United States in the 1991 Gulf War was due, at least in part, to the technological superiority enabled by the Revolution in Military Affairs (RMA). As a result of this impressive show of force, potential adversaries are now believed to be seeking asymmetrical responses to U.S. military preeminence. Many of these asymmetrical challenges are posed by technological proliferation gained via the increased availability of expertise and technologies; relatively inexpensive chemical, biological, and radiological weapons; cyberspace weapons; and information warfare techniques. The increasing access to technology, including the ongoing explosion in information technology, has put advanced weapons and related capabilities into a greater number of

hands than ever before. The successful management of these new challenges requires the identification of new threats, an assessment of intelligence collection and analysis capabilities to identify gaps, and an appraisal of the role of research and development (R&D) for protection, detection, mitigation, response, and recovery procedures. The implications of this proliferation of technology for defense R&D, operational planning, and future arms control requirements, regimes, and methods were the subject of this panel's discussion.

In an effort to establish the appropriate context, the panel discussed two recent presidential decision directives, linking U.S. Government programs addressing arms control, nonproliferation, counterproliferation, counterterrorism, force protection, and consequence management. The first direc-

tive outlines a basic restructuring of the U.S. national security focus for the purpose of critical infrastructure protection. It calls for an expansion of cooperation on critical infrastructure protection with like-minded and friendly nations, international organizations and multinational corporations. The other directive focuses on the weapons of mass destruction (WMD) threat from international terrorism, as well as the implications for consequence management from such an attack. These directives establish a basis for a comprehensive strategy providing protection against and an appropriate response to the proliferation threats of today. This comprehensive strategy must also include an analysis of intelligence and technology sharing arrangements with foreign countries, an estimation of the regulatory and legal measures to be implemented, and a reexamination of the conceptual implementation approach.

### **The Technology Proliferation Threat**

The current international environment is setting the stage for changes in U.S. perceptions of the proliferation threat. As described by one panelist, the end of the Cold War and collapse of the Soviet Union have called into question the fate of Russia's 30,000 nuclear weapons, fissile material, and chemical and biological (CBW) infrastructure, creating a diverse array of potential proliferation opportunities. Traditional arms control was largely successful in meeting many of its objectives and containing the threats of the Cold War era. Today, however, both the focus and the objectives of arms control are changing in response to the new global realities. This new era is exemplified by the implementation of multilateral treaties like the Chemical Weapons Convention (CWC) instead of bilateral treaties like the Intermediate-Range Nuclear Forces (INF) Treaty. Furthermore, the emphasis of arms control is moving from a fo-

cus on delivery systems to the weapons themselves, and from accentuating the quality of treaty-limited armaments over the quantity.

Although monitoring missiles, silos, tanks and armored divisions is difficult, monitoring the proliferation of technologies is extraordinarily complicated, according to the panelist. To combat this monitoring challenge, a number of issues must be acknowledged and addressed. First, detecting the existence of both know-how and the dual-use technologies necessary to produce weapons rather than commercial goods is difficult. The difference between an industrial facility producing fertilizer versus chemical weapons, or producing vaccines versus biological weapons is extremely subtle. These types of facilities have a countless number of willing suppliers, and the products they produce are easy to develop, hide, and explain away. Second, the increased self-sufficiency of national weapons development programs makes the detection of illegal activities much more difficult. For example, North Korea has been able to develop its No Dong missile without external assistance, and has actively sought export markets for this missile throughout the Middle East and Asia. Third, it is much more difficult to track expertise than equipment. The facilitated movement of both people and information across borders has greatly expanded educational and proliferation opportunities. Fourth, illegal programs can be covered up with successful denial and deception efforts and aggressive counterintelligence operations. Finally, there are lower tolerance thresholds in today's environment with the development of potent CBW, many of which require only a small amount of agent to cause militarily significant damage.

Such realities stress the capabilities of U.S. monitoring and intelligence systems,

and complicate the detection of these threats. Moreover, the decreasing effectiveness of existing tools increases the difficulty of enforcing traditional arms control and nonproliferation policies. Tools that had been used in the past, namely national technical means (NTM), diplomatic demarches, and on-site inspections, have declining utility against the technologies of today. National technical means has a limited capability to detect illegal activities unambiguously. The current distribution and deployment of NTM components maximizes support to military operations and traditional arms control, and offers only a limited capability for determining activity inside a potential production facility. Diplomatic demarches have declining utility because it is difficult to include information attained through NTM or by other intelligence means without compromising intelligence sources or methods. Finally, on-site inspections, used in isolation, may have to be so intrusive that they could threaten national security in some instances.

### **Issues and Impacts of Technological Proliferation on Long-Term R&D**

According to one panelist, the proliferation of information and technology is well beyond the control of R&D agencies. Information and technology proliferation is complicated by internet and satellite communications, the growing international mobility of technical personnel, the increasing demand for dual-use technologies, and the unlimited opportunities associated in appropriate response to the proliferation threats of today. This comprehensive strategy must also include an analysis of intelligence and technology sharing

ements with foreign countries, an estimation of the regulatory and legal measures to be implemented, and a reexamination

of the conceptual implementation approach.

### **The Technology Proliferation Threat**

The current international environment is setting the stage for changes in U.S. perceptions of the proliferation threat. As described by one panelist, the technology base for R&D has expanded to include new and growing sectors in the civilian population. Often, these sectors have more immediate technological needs than do military operators. In addition, recent international proliferation-related incidents, such as the use of sarin gas in the Tokyo subway system, have triggered the need for quick response technologies, resulting in new operational requirements for the users and highlighting a significant shortcoming in capabilities. To fill these gaps, major improvements must be made in multiple technologies to augment capabilities and to expand the technology base.

The increased number of consumers of technology, the quicker pace of the arms control negotiation process, and the push for short-term results have greatly hastened the demand for arms control R&D products to the point where short-term tactical needs are eclipsing strategic goals. Whereas the United States spent decades completing the initial Strategic Arms Reduction Treaty (START), the INF, and CWC treaties and their requisite technology regimes, a three to five year timeframe is now projected for concluding START III. Even with these pressures, the panelist warned, it is crucial that the United States maintain the necessary balance between both short and long-term R&D objectives.

### **Export Control, Technology Transfer, and Ballistic Missile Proliferation**

The exponential growth curve of today's technologies has important implications for the relevancy of arms control, both in traditional tasks and in new areas. Technological change will make arms control implementation tasks more difficult and create entirely new national security problems, placing additional demands on resources and reaction capabilities. A thorough understanding of these technologies and the adoption of a wider-ranging, unconventional approach are required to meet the challenge of effective arms control implementation and threat reduction.

The United States has made export control one of the fundamental tenets of its proliferation prevention policy, however, as one panelist contended, its execution is not without its own problems. Even during the Cold War when there was an easily recognizable threat, export control was not an impenetrable shield. In spite of export controls, the Soviet Union was still able to develop WMD, but because of these controls, this process took longer and cost more. Today, it is much more difficult to control technology, and export control processes must adapt as a result. However, the United States must engage in international trade and, therefore, must find effective ways to use export control without adversely affecting its own commerce. To optimize the effectiveness of export control, it must be multilateralized, and key technologies must be targeted for containment.

Beyond export control, the halting of technology proliferation is a complex and difficult process because technology is knowledge, not just a collection of objects that can be restricted through export control procedures. Similarly, transferring an object does not necessarily transfer the technology and knowledge required to operate and maintain that object. Even when an object is

acquired, it cannot always be reproduced, because the reverse engineering of technologies requires technological sophistication comparable to or greater than that of the original producers. Within this context, one panelist cautioned that more attention must be paid to the difference between transferring missiles and transferring missile technology, and how this technology transfer takes place. For example, during the Gulf War, when Iraq attacked Saudi Arabia with SCUD missiles, the Saudis failed to fire back using their CSS-2 missiles because they lacked the operational knowledge for using the equipment.

This instance illustrates that even if technology is transferred, it is not always employed effectively. Moreover, the deployment of certain types of systems is extremely complicated, and requires a great deal more than just the acquisition of the basic technological components. For example, the successful deployment of long-range ballistic missiles requires not only the development of the individual components, but also the integration of the reentry vehicles and payload, propulsion, guidance, control, and ground support infrastructure systems. In addition, ballistic missiles require complicated manufacturing processes, the whole of which is more complex than the sum of its parts. For this reason, the task of system integration should not be underestimated. Moreover, because of these complexities and production requirements, the development of long-range missiles is easily detectable. Ballistic missiles cannot be tested underground and, when tested above ground, leave very obvious signatures which are easily discernible. Finally, long-range missiles cannot be developed using short-range missile technology because the difficulty in developing a missile, both in engineering and material requirements, increases exponentially as its range increases.

According to one panelist, current studies indicate that the United States will not face a ballistic missile threat from countries that do not currently possess such capabilities for at least 15 years. Rather, the proliferation of other technologies will pose a more immediate security threat in the coming years. As a result, resources to reduce those threats should be distributed accordingly. Specifically, the panelist pointed to cyberspace warfare as an important new challenge, the implications of which must be addressed on an urgent basis. He stated that as computers become the central nervous system of modern economies, a cyber-attack could affect critical sectors of the American economy and paralyze segments of the American infrastructure with damage equal to that of a well-placed one-megaton nuclear bomb. Cyberspace warfare is a potentially immense threat that will require the use of all available defense resources to be effectively countered.

### **Technology Proliferation: Security Impacts and Opportunities**

While technology proliferation does not necessarily produce new modes of warfare, it does impose a new set of conditions in which warfare is waged. Consequently, as one panelist contended, traditional threats on the battlefield are being compounded by new technologies. Limited defenses, arms control, and robust deterrents currently underwrite the national security framework. However, a comprehensive capabilities-based approach must be incorporated to operate on a playing field composed of many different potential threats. This approach will require the formulation of a counterproliferation master plan that will examine and leverage existing capabilities. Using a threat-based perspective within this master plan, the impacts of passive defense versus

active defense must also be considered, and a balanced approach must be taken to coordinate the use of counterforce, active defense, and passive defense. Furthermore, the plan must contain guidance regarding the exploitation of vulnerabilities exposed by potential adversaries as they seek to exploit emerging technologies.

As proliferating technologies directly challenge national security, those technologies and how to deal with them become defense-planning problems. As one panelist asserted, a treaty or agreement which establishes international norms of behavior that seek to bound or control the nature of this defense-planning problem can be very beneficial. Despite the positive aspects of arms control, the panelist cautioned, it comes at a cost, and the impact of these costs must be kept in perspective with regard to both defensive and deterrent forces. The military criterion when evaluating a treaty is to calculate the treaty's effect on the military's abilities to accomplish its national security mission. With the complexity, intrusiveness, and numbers of treaties increasing, arms control is often a double-edged sword that places a tremendous implementation burden on the military. Arms control trends demonstrate growth in many directions. As a result, the military must continue to pay close attention and remain engaged in treaty negotiations to ensure that the instruments of defense, deterrence, and arms control act in concert.

### **Summary**

The focus and objectives of arms control are changing in response to the new realities of the post-Cold War period. Many of the changes have been motivated by the ever-increasing access to advanced technologies and the desire by potential adversaries to seek asymmetrical responses to

U.S. military preeminence. The emerging challenge is for the national security community to respond to the threats associated with the proliferation of technology and the related WMD threat by crafting a new approach to the development, management, and maintenance of technology.

The RMA has an important role to play in the process by providing many of the tools needed to augment capabilities and effectiveness. The existing tools used to mount the battle against technological proliferation have been shown to be insufficient. As a result, export controls, R&D, and intelligence methods and capabilities must be adapted and enhanced to meet the challenges posed by modern technologies. In addition, the electronic and physical infrastructure that allows for these tools to be used must be protected from tampering, disturbance, and destruction. Following the implementation of these enhancements, the resulting tools will both promote and complicate the effective implementation of arms control agreements. They will help by providing more discriminating technologies to be used in monitoring and inspection regimes to verify compliance. However, they will hinder arms control implementation by requiring more time and information obligations from the inspecting and inspected parties. Despite these additional burdens, the effective implementation of arms control will ensure its relevancy in the face of continued technology development and proliferation.

The proliferation of technology accounts for the transfer from one actor to another of both objects and the knowledge of how to employ them. However, transferring an object does not always transfer the relevant knowledge. On the other hand, the transfer of knowledge is more difficult to track than physical objects because of the

increasing mobility of people and greater accessibility to highly specialized information. The internet has made the isolation and protection of many types of information difficult if not impossible, and the trend is to grant greater access at all levels of information. While export control can stem a certain amount of technological proliferation, the reality is that controlling the diffusion of technology may only be a temporary stop-gap measure in the long-term strategy of national defense. Therefore, it is imperative that the R&D and national security organizations designed to meet these proliferation challenges are well equipped to stay ahead of their competition.

## PANEL 2 THREAT REDUCTION PROGRAMS: BEYOND CTR

Chair:

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Monterey Institute of International Studies

**Dr. Anatoliy Grytsenko**

National Security & Defense Council,  
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**Dr. Jo L. Husbands**

Director, Office of Development, Security &  
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**Dr. Robert Kennedy**

Director, George C. Marshall European  
Center for Security Studies

**Dr. Susan J. Koch**

Deputy Assistant to the Secretary of Defense  
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**Brigadier General Thomas E. Kuenning,  
USAF (Ret)**

Deputy Assistant to the Secretary of Defense  
for Cooperative Threat Reduction

### Introduction

Many countries possess the capacity to form the building blocks of weapons of mass destruction (WMD). The potential for the proliferation of these components or the use of WMD dramatically increases the threat to international security. Currently, there are several countries, both within the former Soviet Union (FSU) and beyond, that could be encouraged to dismantle or eliminate dangerous WMD arsenals if provided with technical or financial assistance. The Cooperative Threat Reduction (CTR) Program is a novel U.S. initiative for cooperating with former enemies to decrease the strategic threat against the United States. In its own way, the CTR Program illustrates a different sort of Revolution in Military Affairs (RMA) by relying on cooperation rather than deterrence or confrontation with potential adversaries to achieve similar results. In this sense, it truly exemplifies a revolutionary concept of defense by other

means. Panel members explored the evolution and composition of the CTR Program and possible ways to apply it to regions beyond the FSU to prevent, reduce, roll back, or eliminate threats to regional or global stability.

### The Evolution of the CTR Program

The CTR Program emerged from legislation initiated in 1991 by Senators Sam Nunn and Richard Lugar in connection with the collapse of the Soviet Union, and was intended to enhance the safety and security of nuclear warheads and materials during this transition. As described by one panelist, this program established a model for providing material and technical assistance to facilitate arms reductions and related arms control measures in the FSU. The central mission of the CTR Program is to assist the nuclear successor states of the FSU in dismantling and securely transporting and

storing their nuclear, chemical, and biological weapons.

Since its inception, the CTR Program has greatly expanded its mission, geography, and expectations. The panelist described how the program has evolved over time from a Department of Defense (DoD) crisis management program to become a key component of U.S. national security, complete with congressional support and implementation by various agencies of the U.S. Government. The CTR Program originally sought to achieve a diverse range of objectives: eliminate strategic offensive arms previously identified for dismantlement; strengthen the chain of custody of nuclear materials; enhance the safety and security of fissile material storage; facilitate the demilitarization and conversion of defense facilities from military to civilian production; assist in the destruction of chemical and biological weapons facilities; and provide for military-to-military contacts.

The program has since branched out into new areas of cooperation including the conversion of plutonium reactors from military to civilian use and the destruction of infrastructure related to WMD. CTR has also moved into the area of preemptive acquisition in which CTR funds are used to purchase materials that have the potential to threaten U.S. national security in the future. The program has also extended its participation beyond the original states of Russia, Ukraine, Belarus, and Kazakhstan to include projects in Moldova, Georgia, and Uzbekistan.

U.S. Government personnel and their counterparts in the FSU jointly set CTR Program objectives. Following the establishment of these objectives, project requirements are determined and U.S. and FSU project implementers are contracted.

The initial period of the CTR Program was characterized by a lack of trust, and little direct contact between U.S. and FSU personnel. However, the evolution of the program and the combination of U.S. and FSU military and civilian contractor personnel working together has greatly enabled the United States and its partners to implement the CTR Program in a more comprehensive way than was possible in its early stages. Within the next 5-7 years, the CTR will continue to make important contributions to national security by helping FSU countries to meet their arms control obligations under the Strategic Arms Reduction Treaty. Some of these activities include projects to dismantle and eliminate intercontinental ballistic missiles and their associated land and sea-based launchers, and construct a fissile material storage facility and a facility to dismantle solid rocket motors.

The Military-to-Military Contacts Project is an illustration of the creative use of CTR Program authority to engage a target of opportunity. According to one panelist, by sharing different points of view on a number of topics and in a variety of venues, U.S. military officials and their FSU counterparts have greatly reduced the level of Cold War mistrust and have built an ongoing dialogue on civil-military relations. The success of these dialogues provides an excellent example of how to reduce tensions and enhance cooperative relationships between military officials in other regions.

CTR has generated several spin-off projects that are a testimony to the richness and flexibility of the program. Major spin-offs that were once integral to CTR include the International Science & Technology Center (ISTC), the Materials Protection, Control, and Accounting Program; and the Export Control Assistance Program, which have been transitioned to the Departments of



State, Energy, and Commerce, respectively. The transition of these projects from the DoD realm exemplifies the notion of comparative advantage at work, and has led to an impressive display of cooperation involving several government agencies, both in the United States and among the CTR recipient states.

### **Preemptive Acquisition as an Instrument of Threat Reduction**

In addition to the projects listed above, CTR has engaged in three preemptive acquisition projects. These efforts represent a different type of spin-off project that have added enormously to the policy options regarding the continuing problem of WMD proliferation and the challenge of threat reduction, asserted one panelist. The first of these projects, Project Sapphire, involved the acquisition of 600 kilograms of highly-enriched uranium from Kazakhstan in November 1994. The second project involved the purchase of 21 nuclear-capable MiG-29 airplanes from Moldova in November 1997. The last project, Operation Auburn Endeavor, resulted in the removal of 5 kilograms of highly-enriched uranium from an unsecured former research nuclear reactor in Georgia and the transport of that material to secure storage in the United Kingdom in April 1998.

These projects show both the strengths and limitations of the CTR Program, according to the panelist. Primarily, these projects indicate the quality of the cooperative relationship between the United States and the recipient states that encouraged Kazakhstan, Moldova, and Georgia to propose these opportunities to the United States. They also exhibit the ability of the Program to react quickly to high-priority projects. However, the projects also demonstrate some ways in which CTR is currently

limited. For example, CTR legislation requires that Congress be notified 15 days in advance of obligation of funds. This requirement could hold up preemptive acquisitions in the future if a proactive quick-response action is necessary. In addition, the CTR Program only addresses issues within the territory of the FSU. However, the problem of supply-side proliferation from the FSU continues to be a major concern, and therefore should be a major focus of CTR activity within the FSU as well as elsewhere. Finally, as a matter of policy, the CTR Program only focuses on WMD, delivery systems, nuclear materials, and technology and infrastructure related to the development of WMD. While advanced conventional weapons systems may not be a significant proliferation threat at the moment, they may be an important emerging threat, and, as such, need to be more closely examined to develop sufficient CTR-like responses. In these regards, it would be useful to engage in a CTR policy review in order to be able to react quickly in a case where preemptive acquisition is both a necessary and feasible cooperative nonproliferation or counterproliferation activity.

### **New Channels for the CTR Program**

Another panelist described how the basic ideas and approaches of the CTR Program described above are being extended into a number of different issues, countries, and channels. While the CTR Program initially focused on the secure transport, storage, and dismantlement of nuclear weapons and materials, it has since expanded to include biological weapons (BW). Due to the long history of disagreements between the United States and Russia regarding Russia's compliance with the Biological Weapons Convention, it has been a slow and contentious process to find the mechanisms by which to engage the former Russian BW

establishment in CTR-related discussions. However, these types of engagements may afford enormous benefits for both countries.

Cooperative research programs between Western and FSU BW scientists initially began as a limited grant by the CTR-funded ISTC. In addition, the National Academy of Sciences (NAS) was provided with CTR funding to carry out planning exercises and pilot projects to test how cooperative research projects might be conducted between U.S. and FSU institutions. Since that time, other government agencies such as the Department of Energy (DOE) and the Defense Advanced Research Projects Agency (DARPA) have become interested in tapping into this science potential and have begun to plan for cooperative research programs with BW research institutes in Russia. The CTR Program is now beginning discussions with some Russian scientific institutes to look at providing security upgrades at BW facilities. This engagement constitutes a very new, small, and tentative enterprise. Currently, none of the U.S. programs are formally engaged with institutes associated with the Russian Ministry of Defense, since this agency has remained outside the cooperative efforts, and most of the activities are being conducted within the former civilian complex. However, the panelist contended that efforts to engage the military should be a major effort in the future since it has significant potential to benefit U.S. and global security.

There have been important lessons learned as a result of the U.S.-Russian joint research experience. Particularly, the panelist noted, for trans-accountancy purposes, it is extremely important that there be a strong Western presence engaged in these projects. Western collaborators must engage in frequent visits to their counterpart facilities to gain confidence that these programs

are going to be successful, and that they are being used as desired. Moreover, while the tentative price tag to the CTR Program for BW collaborative efforts is \$2 million, the scientific return on these efforts, combined with the results of the other potential projects sponsored by ISTC, DOE and DARPA, promises a fair level of engagement with the Russian scientific establishment. These opportunities indicate that joint research is an area with significant potential for U.S. security and nonproliferation in general.

### **Alternative Applications of Cooperative Threat Reduction**

In addition to the BW programs listed above, several panelists described additional efforts beyond CTR to reduce the level of threat posed by WMD. DOE has instituted a Lab-to-Lab Program in which scientists from Sandia, Lawrence Livermore, and Los Alamos national laboratories engage in discussions on a diverse array of topics with their Russian counterparts. The access and the relationships that have been developed between scientists through the CTR Program and the Lab-to-Lab Program provide a strong incentive to apply these models to other countries. In fact, these programs have formed the basis of a similar effort currently being instituted by DOE in China. This is a much smaller program than the one with Russia because it is not being driven by major treaty commitments, nor is it driven by a sense of risk that motivated the CTR Program and the Lab-to-Lab Program.

Along with formal government-to-government channels, CTR goals and programs can be well-served by non-governmental organizations (NGOs). There is a long tradition of contacts between scientists of adversarial nations in pursuit of technical understanding, confidence and se-

curity-building measures, and threat reduction for nuclear arms control issues. For example, the NAS has been meeting regularly with its Russian and Chinese counterparts since 1981 and 1988, respectively. Moreover, such institutions provide excellent opportunities for facilitating military-to-military contacts. These types of relationships that come naturally through non-government channels may be better able to survive the stresses and strains of political developments than formal bilateral relationships. In addition, NGOs have been used as sources of advice, and are often called upon to provide independent assessments of programs and projects. Finally, NGOs have been strong and constant supporters of the CTR Program and have been useful in countering some of the congressional criticism of the Program over the years by advancing its strength and virtues.

Similar to CTR, the Marshall Center also incorporates a revolutionary concept of defense by other means. Through the Marshall Center the United States is working to create a more stable security environment and peaceful engagement by enhancing enduring partnerships in North America, Europe, and Eurasia. The Marshall Center was originally established in 1991, with a mission to create a more stable security environment by advancing democratic defense institutions and relationships; promoting active, peaceful engagement; and enhancing enduring partnerships. The Marshall Center has educated over 700 participants from 34 countries on a variety of subjects, including a course on how national security strategy is formulated and maintained in democratic societies. These types of courses are at the heart of the Marshall Center's effort to build a network of national security officials from East and West, and most importantly, to support the future of democratic reform in each country. Language training, seminars,

and executive courses relating to defense and security studies are offered throughout the year to civilian and military personnel. The entire range of activities emphasizes the Marshall Center's commitment to a future of peace and security based on dialogue, common understanding, mutual respect, and broad-range cooperation.

## Summary

The existence of WMD arsenals within the FSU and in other countries constitutes a significant security threat to the United States and the international community. The use of U.S. technical or financial assistance to dismantle, destroy, or convert portions of these arsenals and their infrastructure is a major component of the overall effort to reduce the threat from WMD. Built upon extensive coordination with recipient nations, both in the formulation of priorities and the implementation of projects, the CTR Program has achieved solid results and provides an important model that can be adapted and applied to other regions.

Whether projects focus on the dismantlement of offensive weaponry or the joint conduct of non-military scientific research, cooperative threat reduction is a new method of operation symbolizing a regime that uses cooperative techniques rather than deterrence or confrontation to achieve similar results. As such, it represents a new approach to defense and security enhancement in both a theoretical and tangible sense. Beyond DoD, other governmental agencies and NGOs have adopted and adapted this model to decrease tensions with former adversaries, enhance cooperative relationships, and reduce the security threat.

The continued expansion and application of CTR methods to include a broader range of activities within a wider geographi-

cal scope indicates that security threats stem from several different directions. While the CTR Program has shown itself to be adaptable by converting preemptive acquisition opportunities into tangible enhancements to national security, new vehicles are needed to address the security concerns of the post-Cold War era. The expansion of the idea behind the CTR Program must be applied to a wider range of activities in additional regions, in both a bilateral and a multilateral context.

## PLENARY 2

### ARMS CONTROL IN LIGHT OF EVOLVING DEFENSE REQUIREMENTS

Chair

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#### Introduction

At the end of the twentieth century, the rapid pace of political, economic, and technological developments has shattered the certainties of the Cold War security environment. In the past decade, beyond the collapse of the Soviet Union, a number of events have incrementally eroded the Cold War security environment: North Korea and Iraq were discovered to be covertly developing nuclear weapons capabilities; allegations that substances used in the production of weapons of mass destruction (WMD) were being smuggled out of the former Soviet Union (FSU) were uncomfortably frequent; India and Pakistan blasted themselves into the nuclear club; computer hackers penetrated vital defense and commercial computer systems; and ethnic cleansing, intra-state wars, and terrorism have become commonplace.

Faced with these developments, nations have scrambled to develop fresh approaches to effectively address post-Cold

War security challenges. New arms control treaties have been drafted, signed, and entered into force while others are awaiting ratification. New security organizations have come into being, and old ones are undergoing major transformation. Novel approaches to national defense, particularly those which incorporate elements of the Revolution in Military Affairs (RMA), are being elaborated upon and updated to meet these new challenges. In this session, panelists looked beyond the striking developments of the past decade to consider the impact in the 21<sup>st</sup> century of additional factors, including new defense requirements, global technological diffusion, and advancements in technology. Panelists paid specific attention to the implications of these factors for international agreements guiding nonproliferation and other arms control measures.

#### The Limits of Multilateral Arms Control

According to the panelist from Israel, the realities of multilateral arms control are rather somber. Multilateral arms control has

largely been unsuccessful in stemming proliferation activity by determined recipients, indigenous developers, and suppliers. Moreover, the norms generated by multilateral arms control are incapable of dissuading the crossing of certain thresholds or of curbing arms races in the third world. Consequently, multilateral arms control has been unable to quench the thirst for proliferation or curb the appetite for WMD.

In the panelist's view, multilateral arms control appears to be largely irrelevant for a growing realm of defense concerns, including low-intensity conflicts and terrorism, civil wars and intra-state conflicts, and information warfare, all of which are associated with both state and non-state actors. Moreover, multilateral arms control negotiations are difficult to launch, time/resource consuming to conduct, and painful to conclude. The results of such negotiations are expensive and cumbersome to implement, challenging to verify, costly to market, difficult to enforce, and practically impossible to universalize. It is not uncommon for nations to choose not to accede to multilateral agreements or even to go in directions opposite to the norms created by the agreements. In addition, some nations may choose to opt out after acceding to a treaty, while others simply abuse their treaty commitments.

The panelist acknowledged that multilateral arms control, despite its shortcomings, does have a role to play. It assists in establishing a coalition of the willing, helps to set norms and benchmarks, legitimizes export controls and supplier regimes, and provides a basis from which national nonproliferation policies can be pursued. However, multilateral arms control can have two adverse side effects: inducing complacency, and, in some cases, providing cover for illegal transfers of arms or technology. Arms control arrangements can also be

abused to gain technology and techniques to develop and sustain infrastructure. Furthermore, much of the success of multilateral arms control depends on the willingness of the United States – and to a lesser extent the other nuclear powers – to maintain order in the system and influence the incentives for acquiring WMD and ballistic missiles. The panelist remarked that it is difficult to envisage the enterprise of nonproliferation without efforts by the United States to sway or buy off countries interested in proliferation.

### **Defense Planning Priorities**

Defense planning priorities, in the view of one panelist, should include a number of issues, starting with enhanced nonproliferation and counterproliferation efforts. The panelist argued that nonproliferation and counterproliferation are complementary and reinforcing because both play a role in affecting the incentives and the capabilities to proliferate and the ability to generate any benefits from actually possessing the weapons. Second, intelligence activity for monitoring and verification should be focused on threats posed by third world countries as they relate to the discovery of proliferation activities. Third, theater missile defense represents an important area for development because intermediate-range and intercontinental ballistic missiles (ICBM) are a significant concern for the future. Finally, outer space and information activities are additional priority areas to be pursued by defense planners. In all of these areas, the RMA should be encouraged and employed to the greatest extent possible to meet the challenge of current arms control and proliferation trends.

Several implications for the future of arms control flow from the current somber realities, according to the panelist. First, more attention must be devoted to regional

arms control. He contended that, while there has been a natural tendency to focus on multilateral global treaties, regional processes and treaties have the greatest hope of addressing proliferation challenges in terms of both scope and viability. Second, confidence and security building measures (CSBMs) which provide a very effective tool for affecting the overall climate for arms control and cooperative security must be given increased priority because they can also act as a safety net during times of crisis. Finally, the development of more discriminating verification technologies that strike a better balance between intrusiveness, reliability, and tighter enforcement must be built into the arms control agenda.

### **Arms Control and The Revolution in Military Affairs: The French Perspective**

The panelist from France asserted that the French defense posture is based upon threat analysis, rather than the existence of new or evolving weapons technologies. Specifically, France acquires weapon systems for defense purposes that correspond to a realistic appreciation and prioritization of threats to French national interests. Although France takes into account the technological sophistication of weapons possessed by potential adversaries, it does so only to assess whether or not these weapons call into question the credibility of the French deterrent. Even if technologically sophisticated weapons have influences at technical and operational levels, their impact at the strategic level is more important. According to the panelist, France is not preoccupied with sophisticated weapons because the post-Cold War era is characterized by internal national conflicts, for which the demand for sophisticated weapons is low. Moreover, France believes that the general security between nations is less reliant on a balance of current forces and armaments

than the recognition of common values, interests, and risks. The French view is that levels of force capacity should be sufficient rather than superabundant.

Contrary to the preceding panelist's criticism of multilateral arms control, the French panelist postulated that arms control has evolved to the point where ultimate success will require a multilateral effort. Although regional approaches are important, multilateral arms control plays a crucial role in the containment of weapons proliferation, notably WMD, their delivery vehicles, and high-technology weapons. As a result, France has acceded to a number of important multilateral arms control treaties. Moreover, in order to control weapons proliferation, France supports the universality of all existing nuclear, chemical, and biological treaties. Through its participation in a variety of arms control and nonproliferation regimes, France fights against the dissemination of uncontrolled technologies, materials or goods that can contribute to proliferation throughout the world. Finally, for the purpose of more effective export control, France supports the adoption of common criteria and definitions applicable to the exporters of the Organization for Security and Cooperation in Europe or the European Union.

The panelist acknowledged that the multilateral arms control process has problems that must be addressed but contended that this is because the multilateral approach is in its early stages of implementation. The international community must tackle these problems quickly, and take certain steps to improve multilateral arms control. These include limiting the availability of sensitive information on the internet; basing export control decisions on the nature of the exported goods rather than the country of destination; improving the balance between de-

fense and commercial strategies concerning exports; and better management of dual-use technology exports. Furthermore, multilateral arms control must address the new problems associated with the post-Cold War period, such as multiple local conflicts; spillover from a world arms market suffering from reduced transactions within visible and official channels, accomplished by greatly increased transactions in less controlled markets; increased availability of second-hand equipment; the globalization and greater accessibility of information; and the emergence of non-lethal weapons.

### **The Russian Attitude toward START II and Arms Control**

The panelist from the Russian Federation opined that the ratification of the Strategic Arms Reduction (START) II Treaty by the Russian Duma is inevitable. However, the political wrangling between the executive and legislative branches of the government, as well as financial difficulties in the Russian Federation and the potential cost of START II implementation have proven to be substantial barriers to ratification. In general, the panelist was optimistic about the treaty's future. He noted that the slow ratification process reflected the fact that arms control is not the highest priority on the agenda of Russian legislators. However, he stated that most Russians understand the significance of ratifying the agreement and do not consider further reductions to be dangerous to their national security.

The panelist also pointed out that financial issues have had and will continue to have an important influence on some of Russia's security policies. In the future, it is expected that Russia will maintain its nuclear capability, but nuclear plans and force structure will be formulated on the basis of

budgetary restrictions and arms control treaties, rather than threat analysis. In addition, while the Duma has expressed concern about the safety of Russia's nuclear stockpile, it has not been able to appropriate the funds to handle the problem sufficiently. Finally, although Russia's support for the Comprehensive Test Ban Treaty may in part be based on principle, it also cannot afford to conduct more tests, particularly since the primary test site it had used in the past is located in Kazakhstan and is no longer available.

Despite the likely success of the START II Treaty, the traditional bilateral arms control approach between the United States and Russia cannot be sustained indefinitely. The reduction of nuclear weapons from Cold War levels will eventually reach a limit beyond which no further reductions will be possible, since neither country intends to give up its nuclear arsenal. The United States and Russia must work together to incorporate new ways of thinking about arms control across all levels to address the dangerous challenges of the next century.

The purpose of arms control, in the panelist's view, is to prevent dangerous groups from acquiring weapons. With this objective, a new "world order" of arms control should involve a range of cooperative arms control measures. One such opportunity to explore is the development of a joint U.S.-Russian global monitoring system with the potential to extend participation to other countries in the future. Overall, participants in global arms control should not expect an immediate payback but should consider the money they invest in today's arms control regimes to be an investment in their future security.



## **The Role of Nuclear Weapons in U.S. National Security Policy**

Despite many positive changes on the global security scene, nuclear weapons will remain a part of the international scene for many years to come. The motives for nations to acquire nuclear weapons, such as international status and regime survival, are numerous and persevering. Moreover, nuclear weapons remain highly relevant to Russia, especially as the quality of Russian conventional forces continues to deteriorate. The development of the SS-X-27 ICBM, continuing investment in the overall nuclear infrastructure, and the retention of 10,000 to 15,000 tactical nuclear weapons all reflect Russia's ongoing emphasis on nuclear forces within its security strategy.

Accordingly, as one panelist contended, nuclear weapons will remain indispensable to U.S. security needs. In addition to providing for the security of the United States and its allies, the possession of a nuclear arsenal deters nuclear, chemical, and biological attacks on U.S. targets. The U.S. nuclear posture must be structured to counter not only existing threats but also emerging ones. Consequently, all three legs of the nuclear triad must be sustained to provide for the flexibility, effectiveness, and survivability of U.S. nuclear forces. Maintaining the nuclear stockpile, the nuclear infrastructure, and a cadre of professionals with the knowledge to support it should also be a major priority of U.S. national security policy. The stockpile stewardship program will play a key role in maintaining the U.S. nuclear arsenal, especially in the post-nuclear testing era. In addition, the panelist posited that theater nuclear forces that couple U.S. capabilities closely and visibly to the security of friends and allies are very important. At lower levels of strategic forces, theater missile defense and the status of tactical nu-

clear weapons take on added importance. Finally, within the current deterrence paradigm, there is a need for a more balanced relationship among the three elements of deterrence: retaliation, denial, and dissuasion. Current trends and requirements dictate that the importance of denial and dissuasion will increase relative to retaliation over time.

In the interests of U.S. national security and overall international security, the panelist asserted that nuclear arms control must move beyond a mechanical approach and adopt a comprehensive one that accounts for total nuclear capabilities, including forces-in-being, infrastructure, and reconstitution capabilities. Russia and the United States share many objectives, but have some different security concerns, requirements, capabilities, and vulnerabilities. Bilateral arms control efforts should approach security concerns more directly to the benefit of both nations. Moreover, increased engagement with other nuclear weapons states is required to foster relationships and strengthen the stability of nuclear postures.

The U.S. Government can take steps to promote a new approach to nuclear arms control, according to this panelist. Building on favorable trends, the United States should move away from the corrosive policy of mutual vulnerability, which will continue to inhibit the long-term positive evolution of the U.S.-Russian relationship. Moreover, the United States should not allow a mutual vulnerability relationship to emerge with other states, either intentionally or by neglect. The U.S. and Russian governments should also hold discussions about the potential for sharing early warning data and offering assistance to help rebuild Russia's early warning capability. Finally, the verification and monitoring challenges associated

with future agreements governing nuclear weapons will not be trivial, and it is important to move forward on this front.

## Summary

The political, economic, and technological changes that have occurred since the end of the Cold War have greatly altered the international security and arms control environment. To address the security dimensions of this new environment, nations individually and as a group have sought to identify and assess security threats and develop the requisite approaches to manage them. Some of these approaches include an increased emphasis on regional arms control, more creative methods of handling technology exports, and a comprehensive attitude toward nuclear arms control. In addition, enhanced monitoring and verification regimes that incorporate RMA concepts should be given a high priority to reduce WMD and other security threats.

These approaches should, whenever possible, respond to emerging security threats through the implementation of multilateral arms control measures. Multilateral arms control bolsters international security by establishing a coalition of responsive states, sets international norms and benchmarks, legitimizes export controls and supplier regimes, and provides a basis from which national nonproliferation policies can be pursued. As a counter to these positive attributes, however, multilateral arms control also has some drawbacks, including significant costs, constraints, and implementation challenges. In addition, it has been only marginally successful in stemming proliferation, and appears to be of questionable relevance for certain defense concerns, including low-intensity and intra-state conflicts, terrorism, civil wars, and information warfare. Some of these limitations can be

overcome through the implementation of other threat reduction approaches, such as CSBMs and regional arms control measures. Whether the vehicle chosen to bolster security and confidence in the international community is bilateral, regional, or multinational, it is clear that the RMA will play an important role in providing the technological capabilities to meet both present and future proliferation and arms control requirements.

Although numerous elements composing the current security environment are shifting, nuclear weapons will remain a part of the international scene for many years to come. As a result, a broader definition of strategic arms control security interests is needed. Within this construct, the United States and Russia must expand the range of topics currently under discussion. For example, it would be worthwhile to explore possibilities such as the development of a joint U.S.-Russian global monitoring system with the potential to extend participation to other countries in the future. Another approach would be to transfer some U.S. equipment to Russia to bolster its early warning capability. Such measures, coupled with maintenance of the supporting infrastructure and personnel, offer important confidence building benefits that address the realities of mutual cooperation to reinforce nuclear deterrence.

**PANEL 3**  
**NUCLEAR FORCE REDUCTIONS:**  
**WHERE ARE THE KNEES IN THE CURVE?**

Chair

**Admiral Henry G. Chiles, Jr., USN (Ret)**  
Former Commander-in-Chief  
U.S. Strategic Command

**Ms. Thérèse Delpech**  
Director for Strategic Affairs,  
French Atomic Energy Commission

**Mr. Jack Mendelsohn**  
Deputy Director,  
Arms Control Association

**General-Lieutenant (Ret) Nikolai N. Detinov**  
Consultant, Russian Space Agency

**Ambassador David J. Smith**  
President, Global Horizons

**Professor Hu Side**  
President, China Academy of Engineering  
Physics

**Introduction**

Recent trends in nuclear force reductions have contributed significantly to lowering the level of strategic security threats. These reductions reflect improvements in U.S.-Russian relations since the end of the Cold War and, in turn, help to improve the overall relationship. Despite this progress, however, it is necessary to identify potential “knees in the curve” that may act as barriers to further nuclear arms reductions in order to move beyond the progress achieved thus far. It is also essential to increase understanding of how technologies being pursued as part of the ongoing Revolution in Military Affairs (RMA) might be used to help to achieve the desired reductions. The concept of knees in the curve refers to sharp changes or breakthroughs that call for new thinking or responses to emerging issues. Several potential knees in the curve were proposed for consideration:

the world returns to the Cold War; Russian and U.S. nuclear weapons are reduced to the same level as the United Kingdom, France, China; defense technology improvements are made such that defense plays in the strategic equation; Russian “tactical” weapons are reduced to balance the United States; a class of weapons of mass destruction (WMD), either chemical or biological, is eliminated worldwide; action is initiated to reduce conventional armaments worldwide; an undeclared nuclear state (India or Pakistan) acquires nuclear weapons; and the actual use of nuclear weapons, either by a state or a terrorist.

**Europe’s Contribution to the Arms  
Control Debate**

The panelist from France indicated that the European historical experience and sense of vulnerability must be taken into consideration when evaluating the atmos-

phere for arms control discussions. In particular, the European perspective of the complementary relationship between arms control and security has the potential to influence future arms control efforts. Moreover, there is a tendency in Europe to emphasize the political dimensions of arms control over the technical dimension, a fact that is essential for fully understanding the current situation. According to the panelist, the current arms control environment is dominated by the changing relationship between the capabilities of nuclear and conventional weapons, and the development of advanced offense/defense capabilities. Because of these factors, there are questions being raised about the effectiveness of Russia's early warning system. As a result, the role of nuclear weapons as a defining aspect and instrument of international power is being reexamined.

### **The Future of the Strategic Arms Control Paradigm and the ABM Treaty**

From the perspective of another panelist, there currently exists a strategic arms control paradigm, within which nuclear force reductions are taking place. However, the durability of this paradigm is eroding due to several factors. First, the paradigm does not account for reductions in the nuclear arsenals of countries other than the United States and Russia. Second, the paradigm is inappropriate for the new U.S.-Russian relationship. Third, the development of missile defense capabilities and the future of the Anti-Ballistic Missile (ABM) Treaty call into question the appropriateness of the paradigm. Finally, the paradigm is inconsistent with further reductions in the United States and Russian nuclear arsenals. In order to keep this paradigm intact, first strike instability must not be risked, and maintenance of a secure second-strike capa-

bility while deploying defenses must be accommodated.

On the issue of deploying a missile defense capability and its impact on the ABM Treaty, the panelist pointed out that the United States has not hidden its interest in developing a missile defense system and planning for the deployment of that system. In fact, the U.S. Government has adopted the "3+3 Plan" which allows for three years to detect a potential missile threat and three years to deploy a missile defense system to counter that threat. The panelist noted that strong U.S. interest in a missile defense capability has led to serious debate in Russia about strategic and tactical missile defense capabilities, including the use of space-based sensors for guiding defense systems. In addition, the panelist from the Russian Federation stated that the potential deployment of a regional anti-missile system by the United States would endanger the ABM Treaty and compromise the locations of Russian weapons. He stated that because of these factors, the ABM Treaty should remain the cornerstone of U.S.-Russian strategic stability and should be used as a base from which the United States and Russia should conduct negotiations to further strengthen their strategic relationship.

### **Future Goals for US/Russian Strategic Arms Control**

The panelist from Russia also stated that Russian public opinion is overwhelmingly supportive of further reductions in the U.S. and Russian nuclear arsenals. However, this process is currently stalled due to the Russian Duma's delay in ratifying the Strategic Arms Reduction Treaty (START) II agreement. One reason for this delay is the belief by many Russians that the agreement will give the United States unilateral advantages that will harm Russian deter-

rence. The time extension for START II implementation from 2003 to 2007, as agreed to in the March 1997 Helsinki Agreement, will allow Russia more time to complete its commitments and may remove a potential barrier to ratification.

The panelist asserted that the level of interaction between President Yeltsin and the Duma would determine the future of the ratification process. He further predicted that, if this interaction remains confrontational, START II would not be ratified in the near future. As a result, some Russian experts are suggesting that Russia and the United States begin negotiations on START III prior to START II ratification. Once a START III agreement is reached, START II and III could be combined and presented to the Duma together for ratification. The panelist stated that a START III agreement could call for reductions down to a level of approximately 1,000 deployed weapons. However, negotiations below that level will be limited by the size of the arsenals of the other nuclear powers, and should include the participation of the United Kingdom, France, and China. In order to involve those countries in the reduction process, he suggested that they invited as observers to the START III discussions.

In addition to further reductions in the nuclear arsenals, there are a number of other areas upon which to focus arms control efforts. The panelist asserted that a disadvantage of previous arms control agreements is the absence of any arrangements regarding the destruction of nuclear warheads, since existing agreements lack specific requirements for or details on the process for destroying warheads. This area and the long-term monitoring of the life cycle of nuclear devices – including the processing, storage, and control of fissile materials – are

important to explore in future arms control discussions.

### **Implementation of a Nuclear Disarmament Plan**

From the perspective of the panelist from China, nuclear disarmament should be the ultimate goal of arms control and should be conducted through a series of steps building on the START process. He noted that several conditions are required to lay the groundwork for a successful disarmament regime. First, the main goals of nuclear disarmament must be clearly defined. Second, negotiations that address levels around 500 weapons will necessitate the participation of all countries possessing nuclear arsenals. Third, unlike the current START structure, negotiations must be expanded to address the issues of non-strategic nuclear warheads and the destruction of warheads removed from the active stockpile. Fourth, the successful implementation of a nuclear disarmament regime will require more effective verification measures. While some technical problems have been solved, other challenges will demand that countries work together and share the results of their research to propel the progress of verification technologies. Fifth, the establishment of an effective, accurate, international accounting technology regime, primarily responsible for counting plutonium pits, is essential. The counting rules must also be changed to account for all existing nuclear warheads, thus reducing the risk that dismantled warheads could be diverted for the production of new weapons. Sixth, participating countries must adopt a “No First Use” policy and reduce their dependence on nuclear weapons in order to establish the environment necessary for conducting extensive nuclear reductions. Finally, in order for a nuclear disarmament plan to succeed, a new nuclear arms race must be prevented

through strict adherence to the ABM, the nuclear Nonproliferation, and the Comprehensive Test Ban treaties and the pursuit of stabilizing activities such as de-alerting measures.

### **Keys to Serious Reductions in the U.S. Nuclear Arsenal**

The final speaker stated that there are numerous factors that will influence any U.S. decision to reduce its nuclear stockpile further. First and foremost is the political dimension. The U.S.-Russian political relationship is in the process of transforming from active confrontation to active cooperation, a situation that has allowed the United States to consider significant additional reductions in its nuclear stockpile. The panelist asserted that, despite this progress in relations, the current environment would not sustain moving below approximately 1,200 weapons, since a deterrence relationship still exists. However, if a completely cooperative, nonconfrontational relationship were to be achieved, reductions to a very low number of weapons could occur. Second, the levels of nuclear weapons maintained by other countries will also influence the possibility for further reductions. It is unlikely that either the United States or Russia would accept an arsenal smaller than that possessed by the United Kingdom, France, or China, primarily for prestige reasons. Third, since the United States and Russia still have a fundamental deterrence relationship, missile defenses have no clear role to play because of the need to maintain confidence in the ability to deter any attack. Fourth, in the current deterrence environment, chemical and biological weapons present a potential "knee in the curve" because of the difficulty in imagining a scenario where nuclear weapons would be used to respond to something other than a nuclear threat. Finally, non-strategic nuclear weapons will

gain in importance as the number of strategic nuclear weapons decreases.

### **Summary**

The negotiated reduction of nuclear weapons has occurred within the context of bilateral arms control agreements between the United States and the FSU. However, this model is inadequate for future nuclear arms reductions. The precedent of the START Treaty provides a limited venue for continued reductions of nuclear weapons, and the continuing stagnation surrounding ratification of START II is problematic for continuing the trend. As a result, the timetable for START III implementation has been postponed. Furthermore, future nuclear treaties must move beyond the bilateral character of START to encompass other nuclear powers. Finally, future agreements must address topics beyond dismantlement of launchers and delivery vehicles. They must also address limits on the production and storage of fissile materials, nuclear warhead elimination, and possibly nuclear disarmament.

While the RMA can contribute to additional reductions in nuclear forces by supplying new inspection and monitoring technologies and enhancing confidence relating to arms control compliance, it can also present some obstacles toward reaching the stated goals. For example, the issue of deploying a national missile defense system and its implications for the future of the ABM Treaty pose a potential impediment to further nuclear force reductions. In addition, the operational status of Russia's early warning system has been called into question, leaving some doubt as to the credibility of a deterrent relationship based on a secure second-strike principle. Further complications for adopting additional nuclear force reductions are presented by uncertainty sur-

rounding the status of non-strategic nuclear forces and the need to defend against potential chemical and biological weapons attacks, the latter of which has been partly enabled by RMA-related developments.

The United States and Russia, along with the other nuclear powers, must work to overcome such barriers to ensure that the positive trend of nuclear force reductions continues into the future. While the START Treaty is no panacea, the reductions taking place under the START framework present a comprehensive model that can be replicated, complete with monitoring, inspection, and verification procedures. These reductions also set a precedent for reducing other forms of WMD, and play a significant role in limiting and countering the threat presented by WMD in general.





**PANEL 4**  
**CHEMICAL AND BIOLOGICAL WEAPONS:**  
**ISSUES AND SOLUTIONS**

Chair:

**Dr. Theodore S. Gold**  
Director, Joint Advanced Warfighting Program  
Institute for Defense Analyses

**Dr. Kathleen Bailey**  
Author and Defense Analyst

**Ms. Sally K. Horn**  
Director, Nonproliferation Policy, Office of  
the Assistant Secretary of Defense for  
Strategy and Threat Reduction

**Dr. Carol D. Linden**  
Chief of Research Programs, U.S. Army  
Medical Research Institute of  
Infectious Diseases

**General Jean-Louis Rolland**  
Director for Verification, Organization for  
the Prohibition of Chemical Weapons

**Mr. Paul Schulte**  
Director, Arms Control & Proliferation,  
Ministry of Defense, United Kingdom

**Introduction**

In recent years, the dangers of chemical and biological weapons have provided fertile ground for journalists, fiction writers, defense planners, policy makers, and, in a few unfortunate cases, terrorists and rogue states. The nature of the chemical and biological weapons (CBW) threat is changing, and international arms control regimes are having a difficult time in their attempt to stem proliferation and prevent CBW employment. The actors in this arena have expanded beyond traditional nation-states to include subnational and transnational terrorist groups. In addition, current developments in the civilian biotechnology and chemical industries demonstrate the ability of its practitioners to harness technology and reap the benefits of, as well as contribute significantly to, the Revolution in

Military Affairs (RMA). Unlike previous military technological advances, the RMA finds its primary origins and sustenance in the commercial sector, a fact that decreases the ability of governments to control its rate or its diffusion. Therefore, from the proliferation perspective, the union between technology and science simultaneously contributes to and counteracts the ability of arms control regimes to deal pragmatically with the CBW threat. In this session, panelists discussed the value of some of these regimes and the implementation and verification problems that are inherent to them.

**Controlling the CBW Threat**

According to one panelist, the role of multilateral arms control relative to the CBW threat posed by rogue states and subnational organizations differs greatly from

the traditional role that bilateral arms control played in the strategic nuclear dialogue between the United States and the Soviet Union. While there are inherent difficulties in controlling the spread of CBW, the adoption of a passive public policy approach to the issue is not a feasible option, according to one panelist. The overwhelming public support in the West for a CBW ban and the awareness of the need for viable CBW defense programs demand that states move forward on CBW arms control efforts. The ability of states to contribute to the creation of an international ethical norm against the use and proliferation of CBW may be the most effective tool in preventing the spread of chemical and biological weapons and technology. In this spirit, there are a number of ideas worthy of consideration to limit the potential for a CBW attack. One idea is the creation of an international whistleblower program which would extend asylum and protection to individuals offering information on CBW activities. Another suggestion recommends the codification of CBW use within international law as a crime against humanity, to be dealt with accordingly in the International Court of Justice.

As concerns the CBW threat in general, the panelist suggested that the motivation for CBW use by terrorists, subnational groups, and rogue states may, in fact, be reinforced by the RMA rather than deterred by it. To date, many rogue states have resisted a CBW ban, regarding it as a tool of the West to maintain the existing power dynamic. However, it is likely that rather than using CBW attacks as an attempt to alter the international system, such events may be equally motivated by a desire to express total rage against Western domination. The more effective the Western states are in capitalizing on the RMA, the more embedded the feelings of rage may become. Technological advances by the West reinforce the

notion among subnational groups and rogue states that to engage in conventional operations against Western nations is futile, as demonstrated during the Gulf War. Such groups and states may seek to use asymmetrical threats like CBW as a force equalizer against superior conventional forces.

The proliferation of CBW to potential terrorist groups and rogue states represents a qualitatively different type of threat and one that demands novel solutions. Traditional deterrence concepts are predicated on the assumption that players operate under the same rationality framework. However, the strategic calculations of rogue states and terrorist groups do not necessarily conform to conventional theories of warfare. A terrorist organization's world-view and strategic objectives may be founded on the imposition of psychological terror rather than the traditional framework. To that end, when addressing this new threat, one panelist suggested that the traditional concept of deterrence must be expanded to include policy options such as counterproliferation and counterterrorism. These programs, which supplement nonproliferation initiatives, are capable of engaging the rogue and terrorist threat and protecting civilian populations against the psychological terror they seek to impose. A recent initiative by President Clinton has increased funding to counterproliferation programs by \$1 billion. These programs include early detection and warning, identification and neutralization of threats, military countermeasures such as vaccines, and personnel protective equipment for troops to allow them to conduct operations in an environment laden with chemical or biological agents.

## **Implementation of the Chemical Weapons Convention**

Within the CBW context, the Chemical Weapons Convention (CWC) forms part of the front line in the international effort to stem the development and proliferation of chemical weapons (CW). One speaker provided a detailed review of the first year of implementation of the CWC and listed several accomplishments. The CWC entered-into-force (EIF) on 29 April 1997 with 87 original States Parties. Since EIF, membership in the Convention has increased by 24%, with current membership standing at 110. An additional 58 nations have signed the Convention, but have yet to ratify the treaty and assume their treaty obligations.

The basic tenets of the Convention prohibit the use, development, acquisition, transfer or retention of chemical weapons. One success brought about by the CWC thus far has been the acquisition of data declarations from previously undeclared CW possessors. The CWC has imposed limitations on the transfer of chemical precursors to non-members of the Convention, a measure that serves as an economic incentive for ratification and an additional supply-side control, further reducing rogue or subnational access to CW precursors. It also increases national enforcement against CW use, mandating that the ratifying states adopt implementing legislation to incriminate those who engage in or support prohibited activities. While there has been an inherent difficulty in balancing the need for an intrusive inspection regime against State Party demands for the protection of confidential information, the first year of implementation of the Convention has been quite successful in its effort to preserve that balance.

## **The Biological Weapons Convention Protocol: Prospects for Verification**

Another panelist provided a thorough critique of the efficacy of the Biological Weapons Convention (BWC) and its prospects for controlling the proliferation of biological weapons (BW) and toxins. In addition, the panelist cautioned that the technical challenges associated with negotiation and verification of the BWC Protocol are significant and daunting. Currently, the BWC prohibits the development, production, and stockpiling of BW agents. The United States has been actively engaged with the international community, at an ad hoc group level, to strengthen the verification regime. The objective of the BWC Protocol is to identify cheating, promote transparency and confidence building measures, and increase the difficulties associated with BW acquisition. The proposed BWC Protocol calls for data declarations from State Parties regarding biological defense programs; national legislation or regulations criminalizing development or assistance to others; all facilities and sites with BW potential; vaccine production facilities; sites containing maximum containment laboratories (BL-4); and facilities that work with listed agents. Negotiations are still ongoing to develop a comprehensive list of biological agents to be covered under the BWC.

At a more basic level, the panelist suggested that the absence of agreed-upon definitions for certain technical terms in the international community is a major barrier to the adoption of a BWC Protocol. The difficulties in translating precise scientific language to policy-laden terms to be used in a multilateral, legally-binding treaty are enormous. An overly intrusive definition or criteria could be too broad, and make the verification challenge unwieldy. Conversely, a narrow interpretation could miss

key programs and activities of interest. Other unresolved issues that are critical to the successful completion of a verification protocol include: defining a list of pathogens and toxins to be monitored; identifying the place and legitimacy of agricultural and environmental remediation programs which employ biotechnology products; clarifying the difference between production versus research and development; and specifying the limits of small-scale capabilities.

The technical risks facing the United States regarding the BWC Protocol are substantial. The U.S. government has the largest BW defense program in the world, having grown significantly in the aftermath of the Gulf War. In addition, the U.S. biotechnology industry leads the world in related R&D and production of biotech products, often spending over \$100 million to bring a product to the marketplace. The impact of required data declarations on U.S. government and industrial facilities put many U.S. equities at risk. Furthermore, the potential of compromising information through visual observation or the provision of details on equipment, sampling, or access to actively-growing cultures by way of on-site inspections could be catastrophic to U.S. industry. Thus, while the U.S. biotech industry is generally supportive of the BWC and the addition of a verification regime, resistance to routine visits, detailed data declarations, and sampling is probable. Moreover, a stringent on-site inspection regime is unlikely to evolve from current discussions, since such activities are viewed as a threat to the U.S. biotechnology industry resulting in the potential loss of confidential business information.

Despite the required data declarations, prospects to verify compliance and the ability of on-site inspectors to detect illicit BW programs are especially problematic.

First, identifying the facility and the activities that take place within it is difficult for several reasons. The size of a facility required to produce militarily-significant quantities of BW is quite small, and the traditional tell-tale exterior marking associated with nuclear or chemical weapons facilities, a feature which aids on-site inspection and national technical means, is noticeably absent from BW facilities. For example, the Aum Shinriyko BW facility had no distinguishable exterior indicators. Thus, the detection burden increases the critical role which human intelligence sources must play in BW nonproliferation policy enforcement. Additionally, the use of a commercial facility, which is judged as a significant threat in the CW realm, is unlikely for a nascent BW program. The cost and previously mentioned size constraints make prospects for the covert design of new, undetectable facilities more likely. Post-production detection is also unlikely, as cleanup is quick and easy, and one-time production runs may be sufficient to stockpile significant quantities of BW agents. Second, the possibility of false positives also increases the difficulty of detection. As the agents in question are naturally occurring, traces of production could be explained as natural contamination and could be mistaken for, or used to obscure, BW production. Third, controlling the spread of technology through supply-side export controls is extremely complex. Virtually all equipment necessary for BW production is dual-use, and can be found in any university, hospital, or commercial enterprise. Equipment is available via mail-order and is primarily devoid of export controls. Finally, the proliferation of biotechnology makes the likelihood of novel BW production much higher. Consequently, detection will be even more difficult since new "designer" pathogens would be absent from traditional pathogen libraries.

## **Preventing the Diffusion of WMD Expertise**

The issue of preventing the diffusion of WMD expertise is especially challenging. One panelist described how the Cooperative Threat Reduction (CTR) Program has sought to address this problem by establishing U.S.-funded International Science and Technology Centers in which former nuclear weapons scientists are employed in non-military scientific and technological endeavors. However, the panelist pointed out that this model is insufficient given the sheer number of former Soviet BW-relevant scientists, a number which is far greater than that in the nuclear sphere. The brain trust regarding BW research in the FSU is bottomless, and the material and financial incentives offered to BW scientists elsewhere will be far more attractive than newly developed commercial opportunities in the FSU, where the level of science is poor and available resources are limited. Thus, international programs or commercial ventures would be incapable of providing adequate employment opportunities to all BW experts to prevent the diffusion of BW knowledge outside of the FSU.

Another panelist stated the view that the CTR Program, which assists parts of the FSU in destroying strategic nuclear and chemical arsenals and converting portions of the defense sector into viable commercial operations, has a significant trade-off effect: American dollars spent on these projects free up rubles to be spent on the development and production of new weapons systems, thereby increasing overall Russian capabilities. The panelist expressed concerns that comparable cooperation in the BW sector would have similar implications.

## **Summary**

Arms control measures aimed at countering the CBW threat face significant and onerous challenges. Because of current developments in the biotechnology and chemical industries, the number of users of and uses for chemical and biological agents has increased dramatically in recent years. Moreover, CBW embodies an attractive, inexpensive, and effective weapon of choice for non-state actors or terrorist groups to offset the military preeminence of the United States. Thus, controlling the dissemination and deterring the use of CBW has become more difficult to enforce. As a result, the traditional concept of deterrence must be expanded to include policy options such as counterproliferation, counterterrorism, and preventing the diffusion of CBW expertise from the FSU.

As one instrument on the front line of this effort, the first year of implementation of the CWC was a success on several fronts. This agreement provides an important prototype on which to model WMD arms control regimes of the future. However, the CWC model is inadequate for dealing with dual-use technologies and other specific characteristics associated with BW. Moreover, arms control regimes such as the CWC and BWC face an uphill battle in reducing and countering the threat from WMD. The creation of new technologies, brought about in part by the RMA, is necessary to smooth implementation, enhance monitoring regimes, strengthen the ability to verify compliance, and improve the level of confidence surrounding the effectiveness of the treaties.

The effort to stem CBW proliferation will continue to be impacted by the RMA, both in positive and negative ways, as the civilian industrial sector increases its in-

volvement and stake in CBW arms control. The industrial sector has the ability to provide the international community with the technologies necessary to identify CBW agents within an arms control verification regime. At the same time, however, the industrial sector is equipped to develop new CBW agents and applications to counteract the effectiveness of arms control measures. Therefore, meaningful implementation of the CWC and BWC will require the full cooperation of the industrial sector and the direct application of RMA technologies toward meeting the challenge of CBW proliferation.

**DINNER SPEECH BY  
THE HONORABLE JOHN D. HOLUM  
Acting Under Secretary of State  
for Arms Control and International Security Affairs  
and Director, U.S. Arms Control and Disarmament Agency**

It is a great pleasure to be back with DSWA. Many years ago, over a beer, Walter Cronkite asked Mercury astronaut Wally Schirra what he had really been thinking in the last minutes before blasting off on his first mission. Many of you may recall Schirra saying, "Well, I was lying there looking up at all the dials and buttons and toggle switches on the control panel and I thought to myself, 'Good God, just think, this thing was built by the lowest bidder'."

Actually, that one-liner aside, Schirra spent years commending NASA's constant and vigilant monitoring and the safety features built into the craft – which allowed him to see his mission as just another test flight with nothing to fear. Today's arms control environment brought that memory to mind. We are having some harrowing moments. Central principles of global security have been challenged in South Asia. But, as Secretary Albright described in some detail earlier today, a fundamentally sound strategy is in place, and it helps frame both the policy and the means of response – not running off in all directions, but through steady intelligence, policymaking, strategic planning and diplomacy. And like Wally Schirra, we're grateful for the vigilance and diligence of arms control professionals around the world, many of them here in this room, and their dedication to the mission at hand.

On nuclear weapons that long-term strategy has included, among other things, a permanent and near-universal NPT, completion of comprehensive test ban negotiations, technical progress toward better de-

tection, in turn enabling strengthened safeguards for the IAEA, progress with key states – including Russia and China – on technology controls, and relentless, methodical, day-by-day work on the front lines of nonproliferation to sift intelligence, draft demarches, and interrupt shipments. In short, better laws, better enforcement, and stiffened international resolve. All of those efforts are the predicate for the reality that we have been undergirding these past several weeks and that India and Pakistan are now beginning to face – that their tests have planted them on the wrong side of history.

- India and Pakistan have pushed to the forefront weapons the world is leaving behind.
- While the order of the day is economic growth and cutting edge science, India and Pakistan are diverting resources to destructive technologies a half-century old. This is no triumph of technology, only a surrender of self-control.
- India's decision-makers expected nuclear detonations to open the door to a permanent seat on the United Nations Security Council; instead the door is now locked, bolted and barred.

Coupled with nationalistic chest-thumping, and threats to deploy and even use nuclear weapons, those underground detonations could energize a nuclear arms race in one of the most volatile regions of the world.

The most immediate concern is the danger of moves and miscalculations that would shift the odds dramatically toward a nuclear exchange. During the Cold War, we could at least have seen the nuclear "sword of Damocles" commence its swing from thousands of miles away. In contrast, if India and Pakistan deploy nuclear armed missiles, there will be two countries adamantly hostile to one another, with exposed, vulnerable nuclear arsenals as little as three minutes away from each other, and with no reliable way of knowing if an attack is, or is not, underway. Instead of "launch on warning" or "launch under attack," someone has characterized their likely posture then as "launch when the wind blows."

As the President has said, the Indian and Pakistani people are now more at risk, not more secure. So the most immediate message to both is to cease their inflammatory rhetoric – adopt a cooling off period, restore bilateral dialogue, avoid provocative actions in Kashmir, and address the root causes of their tensions. Beyond that, we are vigorously pursuing a comprehensive strategy to address the destabilizing effects of these developments on the region and to reinforce the global nuclear nonproliferation regime.

As a leading element, the world must register its disapproval. India and Pakistan must understand the depth and durability of international ire. In the process, we notify other would-be proliferators that nuclear programs carry untenable costs. India and Pakistan are diplomatically isolated. The G-8 in Birmingham, the P-5 in Geneva, the Organization of American States, and nations East and West, developed and developing, have forcefully condemned the tests. Beyond that, U.S. and other country sanctions, though by no means universal, will

mean billions of dollars in lost trade and defeated possibilities.

The next steps were spelled out by the P-5 last week in Geneva, and endorsed unanimously by the UN Security Council over the weekend – prompt and unconditional signatures on the Comprehensive Test Ban Treaty, no more fissile material production, negotiation and early conclusion of a Fissile Material Cutoff Treaty, no weaponization or deployment of missiles, commitments against sensitive exports.

The ultimate objective remains for India and Pakistan to join the Nuclear Non-Proliferation Treaty as non-nuclear weapon states. In the meantime, there is no chance the Treaty will be modified to accommodate their self-declared nuclear status. Some call this a policy of denial. It is not that. But it is a policy of refusal. And it will persist. Obviously this approach has a long way to go. As of now, both countries seem still to be in a celebratory mood. But the "morning after" is coming. Our task, with many others, is to ensure that truly sober thinking happens in the cold light of dawn, and then the business of reparation can begin.

Events in South Asia have brought all arms control issues back to the front burner of world affairs. As everyone here knows, our agenda was full before South Asia shook. But now it has been rediscovered. And leaving aside apocalyptic headlines about the "coming age of proliferation," the more thoughtful commentary has called for a reinvigorated commitment to arms control – showing, perhaps, that there may be silver linings even in mushroom clouds.

We should use the occasion to complete some unfinished business, beginning with the most salient task – ratification of



the Comprehensive Test Ban Treaty. Some say the South Asia tests nullify the test ban. This morning Secretary Albright compared that to saying any violation of standards is a reason not to have standards. I guess the crime rate would go down if we had no criminal laws – but we'd be a good deal less safe.

Some also argued that failure to detect the tests in advance undermined the case for the test ban. But the CTBT does not depend on predicting tests but on catching tests if they happen. As to that, more than 20 seismic sensors around the world – in Europe, Scandinavia, Western Africa, and the South Pacific – picked up the signal of India's tests on May 11. Within minutes the data pointed unambiguously toward an underground nuclear explosion. These sensors are just one line of the CTBT's verification resources. Its International Monitoring System will provide others, and the Treaty also recognizes national technical means and allows any State Party to request an on-site inspection. The CTBT, combined with unified political and economic will, builds a significant deterrent to nuclear proliferation. What the CTBT needs most is U.S. ratification. Especially now, we need to reinforce U.S. leadership for nonproliferation, by not legally reserving for ourselves something we do not need and will not use anyway, and something we and the rest of the world have rightly condemned in South Asia.

There is unfinished work on the Chemical Weapons Convention. It has been in force for over a year. The U.S. is fully adhering to the military provisions of the treaty. Over seventy percent of OPCW inspectors' time in the first year has been spent in the U.S. But only at military sites. We cannot yet comply with the treaty's industry provisions, because implementing legislation still awaits clean action by the Con-

gress. Now it has been linked to broad, inflexible sanctions legislation aimed at Russia, which the President will have to veto. When effective U.S. leadership on nonproliferation is so crucial, is it really good strategy to make U.S. compliance with a ratified treaty the subject of a tug of war over unrelated issues?

We have unfinished business on biological weapons. The President's initiative has two parts: first, to significantly increase counter-terrorist training and preparations; and second, to develop a strong compliance and transparency regime for the 1972 Biological Weapons Convention (BWC), which is long on prohibitions and woefully short on enforcement. The proposed BWC regime will emphasize transparency from each state party while simultaneously protecting national security and confidential business information (CBI). Balancing those equities will be hard but crucial for us. Consider that of 150 primary patents for new biotech products in 1995, 122 were issued to U.S. firms. Accordingly, each element of the regime, such as data declarations and investigations, is undergoing meticulous consultation with the U.S. biotechnology industry and our extensive bio-defense community. We aim to complete a framework by the end of this year.

We also need to move to the next phase in strategic arms control, to fulfill the promise of Helsinki. Our own preparations for START III are well advanced, and we have had some expert level discussions with our Russian counterparts to begin framing issues and considering how the negotiations will proceed. Actual negotiations depend on Russian ratification of START II. Regrettably, we learned today that the Russian Duma has delayed action. Both sides now must be mindful of the fact that many countries will couple their condemnations of India and

Pakistan's tests with demands for more progress on nuclear arms reductions, as part of the NPT bargain. We have nothing to apologize for – but we also have much work ahead, and need to get rolling.

As you all know, the agenda has other important items, including landmines, the fissile material cutoff, crucial bilateral efforts with Russia, China, and others. But I want to at least give a fair nod in the direction of your conference theme – Arms Control and the Revolution in Military Affairs – by posing some thoughts about critical infrastructure.

The Revolution in Military Affairs is heavily predicated on stand-off offensive capabilities using precision-guided weapons, dramatic improvements in C4I capabilities and rapidly expanding applications of information warfare. Military operations depend increasingly on information dominance. Secure communications, GPS, and "smart" technologies are all developed, implemented or controlled through computers and digitization. And so we must worry that the high-tech backbone of our modern military is far more vulnerable to computer viruses and cyber-invasions than to armor or bombs. We need to defend our defenses.

And we must also defend the country against these new threats. The United States has both spawned and benefited most from the revolution in information and digital systems. All of our critical infrastructures now rely on computers, advanced telecommunications, including to an ever-increasing degree, the Internet, for their control and management, for their interaction with other infrastructures, and for communications with their suppliers and customers. And so we must also worry that if not properly protected, every community in America – every bank, every business, every transportation,

communication, utility, financial, and security system – could be frozen, disabled, compromised, and crashed.

With all its advantages, the very nature of the Information Age – inherently open and accessible – now finds us vulnerable in virtually every essential service that underpins our government and society.

- The *Washington Post* recently reported that computer hackers got into the military's computer system in the Pacific via a Korean network and demonstrated that it could have shut down the entire Pacific power grid. Fortunately, these hackers were part of a U.S. government team examining the security of government systems and did no real damage.
- Last year, just as the Pentagon was preparing for possible military action against Iraq, Air Force and Navy bases were hit by computer intrusions traced to the Persian Gulf. It turned out not to be Saddam Hussein trying to disrupt our military preparations, but some teenagers in California out for fun.

Absent the right protection, hackers could shut down power grids, clean out bank accounts, or disable air traffic controls. Some dozen countries – including Libya, Iran and Iraq – have information warfare programs. As Senator Nunn has already noted, terrorists groups like Hezbollah have home pages on the Internet.

The President addressed this potential national security disaster in his commencement address to the Naval Academy a few weeks ago. And, following a two-year joint public-private effort on critical infrastructure protection, the White House also issued Presidential Decision Directive 63, launching a national initiative to address what some have taken to calling "Weapons

of Mass Disruption." The President has ordered all necessary measures to swiftly eliminate any significant vulnerabilities in our critical infrastructures.

The State Department, reinforced by ACDA, will lead the foreign affairs element of the directive. This exact character of our work remains to be determined, but I have been thinking about it under both of my hats – arms control and international security. It is not only an American problem. Nearly all nations are vulnerable to cyber attacks and nearly all nations have reason to fear for their infrastructure security. And one of the key defining features of our new information infrastructure is that it is globally interconnected. The Cyber War threat is clearly an international cause inviting diplomatic, multinational approaches.

Historically, our foreign affairs establishment has led the way in designing a variety of arms control approaches. In this new era of cyber weaponry, we will no doubt play a key role again. And this, certainly, is a prime candidate for the practice I urged at your conference last year, that arms controllers and defense planners must do better at seeing their work as a collaboration, perhaps beginning with the question, what, if anything, would we control, and how?

This arms control question in the age of cyber weapons is a work in progress, and while we may not have much experience to guide us, we also have the opportunity to create methods, rules, agreements, norms, and even technologies to make Critical Infrastructure Protection meaningful from the outset. We might find a model in the Convention on the Physical Protection of Nuclear Material. Ultimately it may be in our interest to establish international norms and to coordinate national policies to identify and respond to threats.

Specific roles for broader diplomacy have yet to be developed, but they, too, will be important. For example:

- At the most basic level, in real time, diplomacy will have an obvious role if we have information on a threat to the U.S. information infrastructure from a source in another nation.
- Many domestic initiatives have obvious international corollaries, such as for a broad program of awareness and education of the Info War threat, and strategies for cooperation and sharing information.
- U.S. laws will be changed, but to little effect if a threat can simply move to a computer terminal linked to the same network from across the border. Diplomacy will be needed to harmonize national approaches.
- Or what global institutions exist or might be created to deal with the international dimension. Can we find appropriate precedents in our NTIA (National Telecommunications and Information Administration) or the ITU (International Telecommunications Union)?

The bottom line is responding to Info War vulnerabilities and Critical Infrastructure Protection demands public and private participation, arms control and foreign policy experience, defense and high-tech expertise, and the willingness of all to push the parameters of how we view threats to national security. The foreign affairs community has traversed a steep learning curve already, but the issues we uncover, and our responses to them, are bound to escalate sharply in the months ahead. Adding Cyber War concerns to an arms control plate that carries so much might be seen as risky. But each of these separate issues re-enforces one another. Each successful arms control endeavor, each agreement reached or treaty in force, each nation made more cooperative –

are together the fabric that makes up a secure America.

The noted American journalist Jacob Riis used to advise that if you went to watch a stonecutter at work and you saw him break a mighty stone, you should know it wasn't that one blow that did it but the hundreds that came before. That is a good description of arms control. As we marshal all our resources to contain and reverse a potential catastrophe in South Asia – as we continue to wear down the threats of nuclear, biological, and chemical weapons – as we step up to the new threat of Info War – all these are the single blows that together make for the mighty accomplishment of a safer, more secure, and prosperous world.

## **PANEL 5**

### **ARMS RACES AND REGIONAL TENSIONS**

Chair:

**Admiral Richard C. Macke, USN (Ret)**

Former Commander-in-Chief, U.S. Pacific Command,  
and Senior Vice President,  
Wheat International Communications Corporation

**Mr. John C. Baker**

Research Scientist, Space Policy Institute,  
George Washington University

**Dr. Michael Krepon**

President, Henry L. Stimson Center

**Dr. Li Bin**

Director, Arms Control Research Division,  
IAPCM, Beijing

**Professor Albert Pierce**

Professor of Military Strategy,  
National War College

**Dr. Leon Sigal**

Adjunct Professor, Columbia University,  
and the Social Science Research Council

#### **Introduction**

The technological advances that have fueled the Revolution in Military Affairs (RMA) have created a new paradox in the international security environment regarding the extent to which technologies increase regional tension while, at the same time, opening new opportunities to decrease those tensions. On the Korean Peninsula and the Asian Subcontinent, the possession of specific nuclear technologies has added immeasurably to anxieties between inhabitants over regional stability issues. Technologies offer new opportunities to alleviate some of those tensions through improved transparency, monitoring, communication, and command and control regimes provided that the parties take the political decision to exploit the opportunities. With the reality of nuclear-aspirant and nuclear-capable states in Asia, the issue of technology applications becomes all the more urgent. There is a

longstanding need for technologies and tactics that stem and exploit the RMA to ameliorate regional tensions. The panelists discussed the current international security situation as well as potential solutions to alleviate tensions.

#### **Fundamental Perspectives on Regional Cooperation**

A comparison of various theoretical constructs on regional cooperation and conflict management was offered by one of the panelists. According to his account, proponents and skeptics of regional cooperation have long debated the balance between the fragility and constancy of cooperative relations in the international security arena. While one theory posits that states are motivated to cooperate based on leaders' rational calculations of self-interest, an alternative theory suggests that national policy decisions are the result of political processes that

take place between organizations within a state. Both of these theories indicate that states will cooperate with their neighbors only when it suits their own self-interests or when it suits the operational mentality of the organization currently in power.

### **Commercial Satellite Imagery and Regional Transparency**

One of the speakers commented on the value of commercial imagery to increase transparency and its potential for promoting regional confidence and security. According to the speaker, global access to higher resolution commercial imagery has been increasing at an impressive rate. Due to growing international capabilities and the implementation of the 1994 Presidential Decision Directive 23, which loosened the restrictions on commercial high resolution satellite licensing in the United States, many new applications addressing commercial, security, and political requirements have become possible. The latest generation of commercial satellites provides for up to one-meter resolution with panchromatic, multispectral, radar imaging, and hyperspectral capabilities at a fraction of the cost and at a much quicker rate than their predecessors from the 1970s and 1980s. Increasingly, new partnerships are being formed between nations and companies who are looking abroad for assistance in sharing the expense of space-based capability.

These recent developments in satellite technology have important implications for international security and regional transparency. While the use of imagery is no panacea, it provides an ever-expanding tool for addressing conflict management and prevention for several reasons. First, commercial satellite imagery provides accessible and sharable imagery, offering an alternative to reliance on government resources as the

sole basis of information. Second, it could also provide details about activities, such as smuggling, without which governments may not be aware. Third, commercial imagery can also be used to increase the confidence level of countries and to minimize misperceptions and miscalculations on the part of policy makers. Fourth, this technology is less provocative than other monitoring techniques such as aerial overflights or naval patrols. Finally, satellite imagery provides the potential to engage neutral third parties either in the collection or analysis mode.

The importance of satellite imagery to regional security has already been demonstrated in Europe, South America, and Asia, according to the speaker. U.S. negotiators made extensive use of satellite imagery during the Dayton negotiations to influence the decisions of the warring parties in Bosnia. Imagery was also used for peacekeeping and reconstruction activities as well as efforts to locate mass graves. In South America, the U.S. government provided high quality imagery to support negotiations between Ecuador and Peru regarding their border dispute. Currently, researchers are investigating potential applications for commercial imagery within a transparency regime to resolve the Spratly Islands dispute, a situation involving several countries with competing claims for numerous islands in the South China Sea. In addition, the Korean Peninsula represents a region ripe for monitoring technologies. Because North Korea does not possess an adequate monitoring capability, it is forced to mobilize its military forces in disproportionate response to actions, military or otherwise, taken in South Korea. The use of satellite technology to monitor conventional forces could be an important step in reducing the level of tension and avoiding potential conflicts.

The use of commercial satellite imagery also has some potential drawbacks, namely the inclusion of such imagery in misinformation campaigns and the use of such imagery to challenge official assessments either from federal governments or international institutions. Higher resolution commercial imagery can also be exploited for military planning or intelligence-gathering. In these ways, there is a potential for satellite imagery to be abused, misused, or misinterpreted. Despite the potential for misuse, it is clear that satellite imagery has the potential to become a basic component for any monitoring regime and to be used to address issues of international security and regional transparency.

### **U.S. Nonproliferation Policies toward North Korea**

One panelist criticized U.S. foreign policy as applied to nonproliferation policy, particularly regarding North Korea. He contended that the main problem with U.S. foreign policy since the end of the Cold War is the unwillingness of the United States to cooperate with strangers. Instead, the United States has consistently used threats and coercion as tools of foreign policy, and by doing so, has achieved some disappointing and unnecessary results. There is a compelling case to be made for cooperation, which can often succeed where coercion fails and is cheap by comparison. Moreover, in the case of proliferation concerns, the panelist asserted that cooperation is often more appropriate than coercion tactics. In the case of India and Pakistan, coercion failed to head off the nuclear tests because both countries chose to detonate nuclear devices knowing full well that U.S. economic sanctions and other international penalties would be imposed. Since the denial of technology and goods to produce weapons of mass destruction (WMD) cannot be assured

forever, the ability to convince insecure countries not to pursue their WMD development programs requires cooperation and reassurance rather than deterrence alone.

In another example described by the panelist, U.S. deterrence policy failed to achieve results in halting North Korea's nuclear program until inducements were added to the mix in 1994. Before then, the United States had refused to recognize and respond to signs of North Korea's willingness to cooperate with both the United States and the International Atomic Energy Agency (IAEA) to significantly reduce its nuclear program. Thus, according to the panelist, the crime-and-punishment approach of nuclear diplomacy taken by the United States toward North Korea must be considered a failure during that period, because, prior to 1994, the United States placed too much focus on denial after North Korea already possessed all the necessary materials to build a nuclear weapon. Currently, the status of the 1994 agreement with North Korea is in jeopardy. North Korea is accusing the United States of reneging on its commitments regarding fuel shipments and the construction of new reactors, and is threatening to restart its nuclear program and to continue to export ballistic missiles. Despite these new developments, the United States must continue a cooperative approach toward its economic and political relationship with North Korea in order to reduce the potential for military confrontation on the Korean Peninsula.

### **The Implications of the Nuclear Detonations in India and Pakistan**

Beyond the national security justifications given by India in May 1998, the motivation behind India's nuclear detonations is multifaceted. As one panelist explained it, on the domestic scene, the ruling

Bharatiya Janata Party (BJP) wanted to strengthen its position vis-à-vis its coalition partners and political opposition. At the same time, it wanted to cement its reputation as the protector of Indian security by gaining the status of a nuclear power. On the global front, the BJP desired to project its power by performing an act of defiance against the international norm because it felt itself becoming too vulnerable to pressure and intimidation from states within and outside of the region. It also had a sense that its nuclear testing options were being limited by the successful construction of a nonproliferation architecture in the form of the nuclear Nonproliferation Treaty (NPT) and Comprehensive Test Ban Treaty (CTBT).

The panelist opined that the recent nuclear detonations by India and Pakistan have led many to argue that the potential for nuclear conflict in the Asian Subcontinent has increased. Since both India and Pakistan now possess nuclear weapons, one scenario that must be considered is a conventional war between the two states escalating to a nuclear war. Additional scenarios include the risk of a preemptive or preventive strike by one state on the nuclear forces of the other and the danger of an accidental launch of a nuclear weapon. Another panelist pointed out that the successful management of these scenarios is tied to four factors of stability including internal domestic political stability, the stability of bilateral relations, the stability of the arms race, and the capability to maintain stability during a crisis situation.

An application of these stability factors to the India-Pakistan situation reveals several things. While the other nuclear weapons states developed their nuclear arsenals and deployment policies during periods of relative domestic political stability, both India and Pakistan have experienced rapid

transitions in governments as well as mounting economic concerns, complicated further by the recent imposition of economic sanctions by the United States and other countries. Second, the stability of the bilateral relationship is very much dependent on eliminating sources of conflict. India and Pakistan have fought three wars since achieving their independence, and are still actively engaged on the issue of the Kashmir conflict. Third, the imposition of some constraints on the current conventional and nuclear arms race between India and Pakistan would be helpful because of the potential that the uncertainty and the lack of boundaries in that the race will contribute to instability. Finally, India and Pakistan must be able to conclude correctly that there is no advantage in using nuclear weapons in a first-strike capacity; the absence of sophisticated early warning systems in the region makes this problematic. The attainment of the aforementioned forms of stability will not occur overnight, but will require the sustained effort of parties, both within and outside the Subcontinent, to avoid nuclear conflict.

The broader implications of the nuclear detonations on the Asian Subcontinent are widespread and relevant for future arms control and nonproliferation efforts, according to several of the panelists. It is clear that the Asian Subcontinent has succeeded in reclaiming the world's attention as a nuclear danger zone. However, the lack of denunciations in the third world for the actions of India and Pakistan is cause for worry. The mild rebuke issued by some and the outright support declared by others indicate that U.S. concerns regarding the region are not universally shared. Rather, one panelist pointed out that the NPT, regarded as the foundation of nonproliferation policy, is considered by many nations to be only of use to the permanent members of the United



Nations Security Council. Furthermore, he noted that third world countries lack a strong sense of ownership of the NPT and the non-proliferation cause. This notion could prove dangerous to the future relevancy of the treaty and its ability to act as a benchmark for international norms of behavior. Another consequence of the recent nuclear tests is that they have accentuated the tension between nonproliferation and disarmament. Until this point, the United States had been able to diminish some of this tension by helping to construct a successful nonproliferation architecture. However, in the view of one panelist, the irony of the United States pressuring India and Pakistan not to detonate their nuclear devices and punishing them with economic sanctions while it maintains a large nuclear arsenal with deployed warheads has further exacerbated the strain between the “haves” and “have-nots.”

### **Responses to the Nuclear Detonations**

One panelist enumerated four possible responses to India and Pakistan’s nuclear detonations by the international community. At one end of the spectrum, the international community could work toward the reversal of India and Pakistan’s nuclear status and call for both to join the NPT as non-nuclear-weapons states. The second option is to insist that India and Pakistan suspend additional work on their nuclear programs, freeze production of fissile materials, sign the CTBT, and work toward the creation of a nonproliferation architecture in the form of the nuclear Nonproliferation Treaty (NPT) and Comprehensive Test Ban Treaty (CTBT).

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possess nuclear weapons, one scenario that must be considered is a conventional war between the two states escalating to a nuclear war.

Additional scenarioe panelist suggested that the United States and Russia establish a time-bound framework for nuclear disarmament and together with China, France, and the United Kingdom, declare a moratorium on the production of fissile materials. He also recommended that India and China ban the deployment of short-range missiles along their border. Finally, he suggested that the international community consider stricter controls on the export of technologies, urge the negotiation of an agreement between India and Pakistan, and provide early warning capability to both states.

In response to the Indian and Pakistani detonations, the U.S. government formed a joint working group of legislative and executive officials to examine the appropriate tools for a proportionate response in the event that India or Pakistan continues to move toward development of nuclear weapon capability. Given the current situation, it is possible that India, Pakistan, and potentially China might reconsider current approaches to CSBMs. New bilateral discussions should be encouraged to discuss nuclear risk reduction measures, such as verifying the non-deployed status of missiles. Furthermore, several of the panelists agreed that steps should be taken to ensure that penalties exist for extreme misbehavior to demonstrate that serious actions will have serious consequences.

The panelists debated the effectiveness and appropriateness of the imposition of U.S. economic sanctions against India and Pakistan. Proponents asserted that while sanctions were futile in preventing Pakistan’s detonations, they were useful in

sending a signal to potential proliferators that the United States does not condone such actions and is willing to take a stand against them. Critics of the sanctions policy contended that unilateral sanctions are of dubious utility and impede the diplomatic inducements for India and Pakistan. Furthermore, they suggested that it was doubtful that, considering the domestic political climate in both India and Pakistan, the international community could have imposed anything severe enough to deter such actions. While the example of U.S. sanctions has not been widely followed, its consequences are hardly trivial and have already caused the projected economic growth rates for both India and Pakistan to be severely downgraded.

## Summary

The fundamental differences between nuclear and conventional weapons require different thinking and different policies. The nuclear situation in South Asia is one of precarious balance with the emergence of new nuclear powers with small, primitive nuclear devices. These devices are highly vulnerable to preemptive attack and may be manipulated by governments engaged in political, emotional, and psychological conflicts with their neighbors. Given this background, arms control, transparency, and CSBMs, if applied appropriately, can contribute to reducing regional tensions. These approaches could be greatly enhanced, however, by concrete measures that use the RMA to ameliorate tensions were implemented.

The expanding opportunities for acquisition of advanced technologies by regional actors have the potential to both increase and decrease regional tensions, depending on how the technologies are applied. Confidence and transparency among

the regional actors must be increased in order to decrease regional tensions. Commercial satellite imagery, with its global accessibility, timeliness, and improved resolution, has the potential to provide this service and to become a basic component for international security and regional transparency monitoring regimes. Moreover, the use of this technology to monitor conventional forces on the Korean Peninsula represents an important opportunity to reduce the level of tension and avoid potential conflicts. However, the continued development of nuclear weapon and missile technologies has the opposite effect. In the areas of the Korean Peninsula and Asian Subcontinent, the proactive employment of technologies to reduce security risks and regional tensions provides tangible and necessary measures to reduce the threat of WMD in the absence of formal arms control agreements. In addition, according to one view, the United States should consider the use of cooperation rather than coercion with regard to North Korea to lessen the potential for military confrontation on the Korean Peninsula and deter the further development of North Korea's nuclear program.

The recent Indian and Pakistani nuclear tests raise concerns regarding the potential effect of nuclear weapons on the relationship between the two countries, and the need to ensure stability for successfully managing the situation. Furthermore, the implications of the nuclear tests in the global context are widespread and relevant to future arms control and nonproliferation efforts. The reaction of third world countries to the nuclear detonations suggests that the tests have exacerbated the tensions between the nuclear "haves" and "have-nots" and between proponents of nuclear nonproliferation and disarmament. Such tensions could threaten the future relevancy of the NPT and its ability to act as a benchmark for

international behavior standards. As a result, the United States, in concert with the international community, must develop credible, appropriate, and proportional responses to cope with current and emerging proliferation issues. It must also ensure that future proliferators understand that serious consequences result from aggressive actions. As part of this effort, the United States must reevaluate the effectiveness of its sanctions policy in achieving its stated goal of nuclear nonproliferation.



## **PANEL 6**

### **EMERGING ARMS CONTROL IMPLEMENTATION STRATEGIES: INSTITUTIONAL PERSPECTIVES**

Chair:

**Dr. Joerg H. Menzel**  
Principal Deputy Director  
U.S. On-Site Inspection Agency

**Dr. Michael Carling**  
Team Leader, Inspection Operations,  
Organization for the Prohibition of  
Chemical Weapons

**Ambassador Hasan Dervisbegovic**  
Ambassador-at-Large, Ministry of Foreign  
Affairs, Bosnia-Herzegovina

**Mr. Richard Hooper**  
Former Director, Division of Concepts and  
Planning, Department of Safeguards,  
International Atomic Energy Agency

**Brigadier General John C. Reppert, USA**  
Director, U.S. On-Site Inspection Agency

**Dr. Kent G. Stansberry**  
Deputy Director for Arms Control  
Implementation & Compliance,  
Office of the Secretary of Defense

**Brigadier General Peter von Geyso**  
Director, Federal Armed Forces Verification  
Center, Ministry of Defense, Germany

#### **Introduction**

Over the past decade, an unprecedented number of arms control agreements have been concluded and confidence-building activities undertaken. Verification and compliance issues have moved to the forefront of the diplomatic dialogue among countries and international organizations. The international community has created processes and institutions to comply with new obligations and to ensure compliance by treaty partners. National and international on-site inspections have become the norm. Military commanders have been charged with destroying arms and military installations, preparing sites for inspection, and furnishing and hosting inspection teams. One new international institution, the Organization for the Prohibition of Chemical

Weapons (OPCW) was created, and another, the International Atomic Energy Agency (IAEA), was given unprecedented rights.

Despite the increasing importance of the Revolution in Military Affairs (RMA) in security matters, human and organizational factors remain essential to carrying out the terms of arms control agreements. However, while individuals and institutions are still central to arms control implementation, they are increasingly using technologies being developed under the RMA to fulfill their duties. Panelists discussed recent activities and their implications for national, regional, and multinational arms control implementation strategies.

## **Ensuring U.S. Compliance with Arms Control Agreements**

During negotiations, it is imperative that the participants be realistic as to what objectives can be achieved in a given period of time and take small steps to achieve these objectives. One panelist contended that participants must also keep long-term goals in mind, and be absolutely sure of what they are about to agree to before they sign any document. As the language and issues involved in negotiations become more and more technical, documents become vulnerable to multiple interpretations. To resolve this problem, it is important that commitments made during negotiations be very specific and concrete. In the phase between negotiations and entry into force, concrete guidance is also required for the implementing organizations. Moreover, these organizations should be called upon to provide regular feedback on the status of preparations to indicate their readiness to meet treaty obligations.

The panelist went on to say that during the implementation phase, surprises and conflicting interpretations over treaty obligations should be expected. It is in this phase where arms control has the greatest potential to induce conflict. There are inherent tensions between arms control and other national security areas that can make implementation problematic. Tensions can come from inside individual parties as well as between inspector and escort groups. Thus, the dynamics of arms control implementation often create as much tension as they alleviate, and inspectors must be fully prepared to handle these conflicts in a manner such that the treaty objectives and obligations are fully achieved. Moreover, they must keep complete files regarding the implementation procedures because every act sets a precedent. It is also at this phase that

the importance of practice and preparation cannot be overemphasized. The multiple mock inspections that are performed in preparation for an inspection have paid off by identifying areas in which procedures that were implemented differed significantly from expectations.

## **The Evolution of the On-Site Inspection Agency**

One panelist noted that the On-Site Inspection Agency (OSIA) is one of the critical elements that contribute to the effectiveness of arms control regimes on behalf of the United States. OSIA was established in 1988 for the purpose of assisting with the implementation of the INF treaty. As with any ten-year-old organization, the problem with OSIA in terms of readiness is that it is still learning its limitations. While OSIA is eager to make contributions to the implementation of new arms control measures, all the implications of information warfare, biological warfare and other issues associated with proliferation are not yet understood. Eagerness is no replacement for the kind of preparation required before entering into an agreement. In such cases, participation without preparedness would do more harm than good. However, one advantage of OSIA's youth is that it is not tied to tradition, leaving it more open to new ideas, procedures and tools.

The panelist noted that the RMA has several important components that apply to arms control implementation: technology, the effective employment of that technology, and the people who can apply those concepts and utilize this technology. It is important to increase readiness by incorporating new ideas and methods. The challenge to OSIA is to think in unconventional terms about what is possible to achieve, how to make that contribution within the current

national security policy structure, and how to market the tools and concepts that are developed in this type of activity for the larger national security community. If the United States is as successful in selling the tools of peace as it has been in selling the tools of war, there will be enormous growth and expansion.

The panelist further asserted that the arms control community faces an enormous challenge to provide India, Pakistan, North Korea, and parts of the Middle East and Latin America with viable alternatives to missiles and warheads. Implicit in that challenge is the discussion of how to use the tools of national security policy to achieve the desired results. One encouraging factor is to consider what the world might look like today if arms control had not undertaken this process. Arms control has changed dramatically over the past ten years, and the next ten years should provide for the same growth, dynamic change, and opportunity.

### **European Arms Control - Future Perspectives**

Another panelist pointed out that arms control has contributed significantly to the historical changes in Europe during the last decade. The Conventional Armed Forces in Europe Treaty (CFE), the Vienna Document, the Open Skies Treaty, the Dayton Peace Accord, and the Chemical Weapons Convention (CWC) constitute the majority of Europe's participation in arms control agreements. States participating in all five of these major regimes benefit from their synergistic effects, as do the rest of the continent, and the world as a whole.

The panelist stated that at the institutional level, national verification organizations will continue to be responsible for the implementation of conventional arms con-

trol agreements on European territory. In addition, the growing trend of supplementing major arms control treaties and agreements with regional agreements will likely lead to verification organizations becoming more involved in regional arms control implementation as well as fact-finding missions. As the multinational nature of missions increases, there will be a greater need for coordination of verification missions between countries to establish priorities, objectives, and procedures. Another complicating factor associated with multinational missions is the variety of and disparity between definitions and standards. Common international standards regarding the implementation of verification measures are one solution that would enhance security and predictability on all sides. Inspector training courses, which are offered by NATO and individual member states and which are designed for international participation, must be adjusted according to this objective.

Arms control procedures will increasingly become instrumental in meeting crisis management needs, according to this panelist. These procedures may include taking inventories in compliance with peace treaties signed after armed conflicts and conducting inspections of specified areas in cases of unannounced concentrations of force or mobilization-like exercises. The amount of available information related to security and arms control will continue to increase due to additional obligations to provide information, new technologies, and enhanced cooperation. This will have implications for personnel assigned to planning and evaluation and will also make it necessary to continuously update resource databases and assess the support requirements for information technologies. In spite of the possible employment of new technologies, on-site inspections and evaluations will re-

main the key to effective arms control implementation. Confidence and trust, which are a major part of arms control, can only be established in the context of interpersonal relations. These types of relations are the cornerstones that constitute the means of support necessary for meeting arms control objectives.

Beyond the activities already underway, there are a number of areas, including export control, overflight, and verification regimes, that will require increased attention from European arms controllers. According to the Organization for Security and Cooperation in Europe (OSCE), one goal should be a unified European arms control regime with restrictive regulations on armament exports to improve the control of the transfer of conventional armaments. Furthermore, if the Treaty on Open Skies is not ratified and entered into force, an aerial inspection regime within the scope of the CFE Treaty or on a sub-regional basis should be considered as an alternative option. Finally, a verification regime to augment the Biological Weapons Convention (BWC), similar to that used in the CWC, would contribute significantly to countering the threat of biological weapons. Cooperative arms control, together with collective defensive efforts and verification, is and will remain the centerpiece of cooperative security and stability in Europe and in other regions of the world.

### **Arms Control Challenges for Bosnia-Herzegovina**

Using a more specific application to illustrate the issues associated with arms control treaty implementation, the Bosnian panelist detailed the arrangements surrounding the Dayton Peace Agreement. He contended that this agreement is a complex, balanced package of political and military arrangements reflecting a delicate compro-

mise among the involved parties. Implementation of confidence and security building measures (CSBMs) and the arms control arrangements for Bosnia-Herzegovina and its two neighbors are an important part of this peace package. Under considerable pressure from the international community, these agreements were initially negotiated and implemented a few months after the end of the three-and-a-half-year war. The U.S., together with a number of UN members, helped to end the war in Bosnia-Herzegovina, leading to the Dayton Peace Agreement and continued monitoring of its implementation.

Prior to the Dayton Agreement, there had been no experience in processing CSBMs and arms control activities in the diplomatic or military circles of Bosnia-Herzegovina. From the start, participants were forced to contend with all the problems inherent in the post-war period, with distrust between the warring parties being one of the most significant issues. In spite of the initial hesitation in the beginning of 1996 and other delays in implementation, CSBMs and arms control activities, especially reductions in armaments, have had a positive impact on the overall security situation in Bosnia-Herzegovina.

The panelist noted that from the very beginning, it was evident that an arms control agreement would require the willingness of the Parties to openly exchange information on their forces and armaments in a manner similar to the CFE Treaty. These Parties accepted a verification regime based on inspections, and agreed to the physical reduction of armaments above the agreed ceiling. However, implementation of the Dayton Agreement has not occurred without difficulties. One major problem concerns the issue of inspections. The State of Bosnia-Herzegovina has the right to carry out its



own inspections in Croatia and Yugoslavia, according to the panelist. Croatia and Yugoslavia accepted this in principle, but only if and when the properly elected political authorities of the State of Bosnia-Herzegovina agreed to them, and if the inspection teams consisted of representatives from all three constituent groups. These conditions blocked the conduct of inspections during the last months of 1996. In fact, two years later, this problem is not yet resolved. With the exception of this example, however, the professional manner and cooperation among the involved parties who have conducted inspections under the agreements have been crucial aspects of the success experienced thus far.

### **Turning Points for International Safeguards**

Applying the principles of arms control on a multilateral basis, the IAEA has achieved much progress toward the implementation of enhanced nuclear safeguards throughout the international community. As described by one panelist, non-nuclear-weapons states are obliged to negotiate a comprehensive safeguard agreement with the IAEA, in accordance with the nuclear Nonproliferation Treaty (NPT) and certain regional agreements. As part of its responsibility to implement Article III of the NPT, the IAEA establishes a safeguard system based on nuclear material accountancy on a facility-by-facility basis in non-nuclear-weapons states. Once the comprehensive safeguards agreement enters into force, the first action required by the state is to declare to the IAEA the sum total of nuclear material that it owns by location, quantity, and type. While this system has proven to be effective in many respects, conclusions reached regarding a state's safeguards tend to relate to the correctness of the data declarations offered rather than the completeness

of the information. Therefore, it is often difficult to detect the existence of materials not included in data declarations.

The panelist detailed other limitations of this system, which are exemplified by the situations in Iraq and North Korea. Because Iraq was a long-term party to the NPT, the IAEA implemented safeguards in specified portions of four Iraqi facilities. During the 1980s, at the same time that IAEA inspectors were present, the Iraqis were developing a nuclear weapons program in other parts of the same facilities without the knowledge of the IAEA inspectors. It is possible that such activities would have remained clandestine but for the fact that Iraq lacked both the technical management and technological infrastructure necessary to support this investment, and was forced to look beyond its borders for the necessary materials to support this program. It was at this point that the outside world started to gain an understanding of what was occurring within Iraq.

North Korea presents a very different situation in which IAEA officials have been hamstrung by the lack of access to information. North Korea acceded to the NPT in 1988, and, in its initial data declaration to the IAEA, it reported that a single hot test was performed and a small quantity of plutonium and nuclear waste was produced. The IAEA has not been able to verify this because the plutonium and the waste presented are inconsistent with the activities North Korea claimed to have executed. Furthermore, there are questions regarding the environmental samples in which the type of plutonium was inconsistent with the plutonium cited in the initial declaration. Also, North Korea denied a request by the IAEA to gain access to what appeared to be nuclear waste storage locations that had not been included in the original declaration,

despite the fact that special inspection rights were contained within the existing safeguards agreement between the IAEA and North Korea. This situation continues today.

Unlike Iraq and North Korea, the completeness of inspections in South Africa represent a real success story for the IAEA. South Africa, which made the decision to eliminate its nuclear weapons and to join the NPT, was primarily concerned with the identification of all material recovered from dismantled nuclear weapons. With the help of the South African government, the IAEA was able to conclude that the amount of material presented was consistent with what the government was capable of producing. This positive experience provided a significant portion of the conceptual development that went into the design of the follow-up inspection safeguards regime.

### **93+2 Program**

The development of the 93+2 Program resulted from the Iraqi experience, and was designed to reduce the potential for State Parties to the NPT to be able to execute secret nuclear weapons development programs beyond the reach of the IAEA. As described by one panelist, the production of nuclear material involves interrelated activities that imply the production of nuclear weapons-grade materials, such as the existence of certain equipment, environmental traces, and a predictable utilization of nuclear material. These facts provide the basis for a great deal more information from states regarding the whole of the nuclear program and related activities. New technical measures, the collection of environmental samples, and broader inspector access serve as the foundation for the audit procedures adopted by the IAEA and contained in this regime.

The 93+2 Program is intended to develop a new kind of audit function with integrated protocols including expanded declarations, additional evaluations of information, new technical measures, and increased inspector access. Specifically, the program requires the creation of a series of administrative arrangements to streamline the implementation of safeguards. It also calls for information about and/or inspector access to all aspects of States' nuclear fuel cycles, and any other locations where nuclear material for non-nuclear uses is present; all buildings on a nuclear site; fuel cycle-related R&D; manufacture, import, and export of sensitive nuclear-related technologies; and the collection of environmental samples beyond declared locations when deemed necessary by IAEA officials.

### **Inspections Under the CWC**

One panelist provided a detailed description of the significant progress made by the OPCW in establishing a sound base for the implementation of the CWC since the Treaty entered into force one year ago. The treaty has been ratified by 110 countries, inspections have been carried out, data declarations have been verified, and a stable organization has been established where problems can be discussed and resolved. In the first year of the CWC, over 200 inspections were conducted in 25 countries. These consisted of routine inspections of declared facilities, and were executed with the objective of confirming the accuracy of the data declarations submitted by State Parties. Investigations involving the alleged use of CW and challenge inspections have not yet been initiated and will be a major test of the organization and its inspectors. Of the inspections conducted so far, 156 were conducted at military facilities, while 48 took place at industrial sites. Inspectors spent an average of 112 days on site per year. Inspectors

were always escorted by personnel provided by the host state, and escort teams were exceptionally professional and well-prepared and helped to ensure that the inspections took place in a quick, efficient manner.

The future success of verification under the CWC is tied to several issues. First, although there is a learning curve due to the varied backgrounds of the inspectors, the procedures instituted by the inspection team must be consistently applied throughout all the inspected states. Second, there is a strong need for inspection teams to develop more coordinated standards and techniques to avoid creating hostilities with inspected parties. Finally, the continuous monitoring of CW destruction sites must be maintained. This is problematic, however, since the resources of the OPCW are limited and will not easily allow for inspection teams to be located at all destruction facilities on a continuous basis.

## Summary

The impressive number of arms control agreements and CSBMs negotiated within the last decade has sparked the creation of new institutions and processes to accommodate international obligations. It has also placed an increasing amount of international attention on the subject of arms control implementation, compliance, and verification. Technologies spawned by the RMA have played an important role in enhancing the regimes for monitoring arms control compliance. Specifically, the employment of advanced technology created to enhance on-site inspection and information exchange capabilities has added immeasurably to the viability of arms control measures such as the CWC and the 93+2 Program.

The organizations charged with implementing arms control measures have an

ever-expanding portfolio of responsibilities. The increasing number of regional agreements will likely lead to those organizations becoming more involved in regional arms control implementation as well as fact-finding missions and crisis management situations. This will require a greater degree of coordination of monitoring and inspection missions between countries to establish priorities, objectives, and procedures, as well as the development of common international standards for conducting such activities.

Cooperative arms control, together with collective defensive efforts and verification, is and will remain the centerpiece of security and stability in Europe and other regions of the world. This reality is exemplified by the 93+2 Program, the CWC, and the Dayton Peace Agreement, which illustrate how cooperation, data exchange, and on-site inspection, respectively, have added immeasurably to increased security and regional stability. The viability and importance of this type of arms control are further reinforced by the achievements of the CWC, which represents a new generation of multilateral arms control regime with enhanced inspection obligations.



**LUNCHEON SPEECH BY  
THE HONORABLE JOHN J. HAMRE  
Deputy Secretary of Defense**

Thank you, General Curtin, very much. I was looking forward to talking to you today until I looked out and saw two of my old colleagues from the Senate Armed Services Committee, Dick Combs and Bill Hoehn and they used to routinely come to my office and tell me I didn't know what I was talking about. And so this is a scary thought, indeed, to have them here. Good to see you guys. Thank you for coming.

If I may, let me begin, by sharing a remarkable personal experience this week. Earlier on Tuesday, I went out to Omaha to visit the Strategic Air Command. Well, it's not called the Strategic Air Command anymore. We did away with that. It's Strategic Command. And then I find myself on Thursday coming here to talk to 300 arms control experts, a very interesting juxtaposition in my life. I went out on Monday night and had dinner with Gene Habiger and his wife Barbara. I don't how many of you have ever been there, but Gene is in the command quarters that Curtis LeMay occupied and in the basement is Curtis LeMay's bomb shelter. It's really stunning to go down there. It's like a trip 30 years back in time, complete with a hand cranked air exchange system and hand cranked telephone which is EMP hardened, of course. It was tested every Friday until 1988. It had about a two-inch thick blast door covering the window that I guess you crawled out of when it was all over.

Later I sat down and talked with Gene Habiger. And I know, somewhere, wherever Curtis LeMay is, he must have been just dying to hear the things that Gene Habiger, his successor, is now talking about. Gene had just returned the night before from

a two week visit to Russia where he toured a nuclear submarine, went out and saw a silo complete with active warheads, saw the command and control system, saw the custodial stewardship procedures that Russia has for warheads. And I thought to myself, what a remarkable thing it is to Gene's, enduring credit, that he has seen his tenure, his stewardship responsibilities as the head of the Strategic Command to create probably one of the most sophisticated and successful dialogues with his counterparts in Russia during the last three years. It is absolutely remarkable.

It told me more than anything what a remarkable transition we have all endured these last eight to ten years. It is a different world. A hugely different world. In many ways, in a beneficent sense, a different world. I think it is greatly reassuring that we live in a time when the head of our Strategic Command can sit down with his counterpart in Russia and talk about nuclear surety issues and command and control issues and custodial issues. I don't think I ever anticipated having lived long enough to have experienced that, yet, it is very real.

At the same time, we live in a much more complicated and, I would argue, a more dangerous world. Not just because of the events of the last month [the India and Pakistan nuclear tests], troubling as they were. But really, the gradual unfolding of a world that is troubling, indeed, I suspect has been the focal point of so much of your conversation these last two days. Let me, at this stage, say how much I admire you, Gary, for setting up this conference and actually continuing these conferences. I think it again

reflects the enormous professionalism of our Department of Defense and the creative spirit that people like [Major General] Gary Curtin and [Brigadier General] John Reppert and others who have been so much in the forefront of pioneering new relationships with our uneasy partners in this spaceship Earth that we share together. And I thank you for doing this and I thank you for asking me to come. I'm grateful for that.

I believe that this new world that's unfolding and the challenges of containing chemical, biological and nuclear weapons represents the signal security challenge of the next decade, if not the next century. I don't think that there is a more important, and arguably, not a more complicated problem than this. And it's going to take fully all of the creative energy that these remarkable people that work for our department and all of you who work in other parts of our government or in non-government agencies, either of the United States or overseas, all of our creative energies to deal with this.

It was only, six years ago, Bill Hoehn, when you were working out the Nunn-Lugar program to get it going and the best you would say was our government was apathetic, right Dick Combs? We even confronted active opposition of some in our government to what, I think, has been singularly one of the most successful and important programs that we've had in the last five years. In this period of time, I think we've had a huge transition for those of us in the Department of Defense, and I actually believe it's the consensus view in our government that threat reduction constitutes a primary defense mission. There was once a time when it was viewed as a liberal, left-wing diversion to the real challenge to maintaining a strong defense. And, I think, people are now realizing that threat reduc-

tion now represents a primary defense mission.

I think a world perspective has emerged because of some very significant changes in the last five years, to eight years. The collapse of the old Soviet Union and the making available in a very unsettling way the knowledge and the tools of a large military that is now available to third parties is a scary picture for everyone, not just the United States. It isn't just us who face this at all.

And let me say, I think part of the reason why the CTR program has been so important is it's been able to establish a framework for interaction with Russia. We've had success in the last six months, working with Russia to try to prevent the proliferation of knowledge and things to other countries that would be, frankly, detrimental to Russia's security as well as others in the region. Bob Gallucci has been very instrumental in this. That's a profound and very far reaching development, and I would argue that we've been dealing with it fairly successfully, when you consider the complexity of the task.

I think a second thing that characterizes this period is the emergence of a willingness by terrorists to contemplate the use of chemical or biological weapons. It's obviously passé now to refer to the sarin attack in Tokyo. But, if ever there were a wake up call, it was that. Or a couple of homegrown kooks out in Nevada that want to pretend they've created anthrax to poison Americans. It's an unusually difficult problem to deal with. And for the first time, our Government is seriously now talking about homeland defense in very significant and profound ways. And I'd be glad to talk about that. I don't intend to spend much time here

talking about that. But I'd be glad to discuss it if you're interested.

I think a third development which is troubling has been, the collapse in the interest in the United States in nuclear weapons. This was, after all, for years, the premier defense mission. And we built up a remarkable organization in the Defense Nuclear Weapons Agency, where the best and the brightest sought careers. And yet, in the last five to eight years, there's been just a significant reduction in interest of our best and brightest in this career field. Nuclear weapons aren't going away as much as we would wish it. But we can't afford to lose our intellectual competence in dealing with it. And that's a very significant challenge and one I know that Gary has been working on.

I think an equally important development of the last four to five years has been the increasing vulnerability of the American infrastructure caused by American productivity in using computers to run business processes and physical processes. I know that you've had some discussion about this before I arrived today. I apologize for not having been here earlier, but I spent the morning testifying in front of the House National Security Committee on this issue, America's vulnerability to a cyber attack and the significance of our vulnerability to cyber attack.

Now, I reviewed these developments as an introduction to context of our thinking when last fall, we decided that we needed to make a fairly significant change in the way we were organized at the Department of Defense to deal with these challenging developments. We believe that there was no more important national security mission that we faced in the next decade than threat reduction and counter proliferation and we were

poorly organized to deal with it. Not that we didn't have remarkable people working on it. But we were not organized in an integrated way to deal with this very comprehensive problem. We had, obviously, very strong organizations to begin with, DSWA; On-Site Inspection Agency [OSIA]; DTSA, the Defense Technology and Security Agency. But we also have boutique, and I don't mean that in a negative sense, but boutique organizations that were dealing with the Nunn-Lugar program, the CTR program. And we found that in various ways we needed to bring this together into a coherence and into a whole.

So we set about the process of creating this new organization called the Defense Threat Reduction Agency. And that's really why I wanted to come and talk to you. I wanted to tell you about this organization and our plans, at least in the near term.

First, the organization will become operational officially on the 1st of October. We have been already initiated a transition. The infrastructure is in place and we will, I think, in a month be transferring the entire Cooperative Threat Reduction program to the new agency. It's going to take a little bit of time to make the transition to bring the other elements together because we are going to consolidate to a single space and that does entail relocation and the turmoil.

Now, let me, first describe the goals of the organization and what we're going to try to do. There are going to be three primary missions for the new organization. First, and I would say foremost, but I don't want it to look like it's disproportionate in weight, is to maintain our current nuclear deterrent capability. That is still, singularly, one of the most important challenges we face. And it means providing the technical expertise to manage this infrastructure. We still have a large and will, I think, always

have a large infrastructure of nuclear capability. And we have to husband that and we have to maintain the intellectual infrastructure to support it. This organization, of course, will be responsible for the Defense Department's stockpile stewardship duties and provide technical support in that area.

The second primary mission is going to be to reduce the threat from weapons of mass destruction. Within this mission there are obviously important elements, such as treaty monitoring and on-going support of the confidence building measures. And here, I think we're fortunate to be able to build on the base created by this remarkable little organization called OSIA. Over the last ten years, this is really a gem and has done some really great things. And I think we have a wonderful infrastructure to on which to build the new organization. And it's on that root stock, as it were, we're going to graft, for example, the cooperative threat reduction program.

The third mission is to counter weapons of mass destruction threats. Here, we seek the full panoply of capabilities. We need to develop modeling and simulation skills. Especially for biological and chemical weapons. We do not have the intellectual infrastructure for biological and chemical threats the way we have it for nuclear threats. We spent a long time thinking about nuclear weapons. When the United States abandoned biological weapons in, I think, 1969, we really lost the intellectual infrastructure that goes with having an offensive program. It's a fact of nature that military organizations tend to devote an order of magnitude more attention to things if they're on the offense than if they're on the defense.

We have not sustained and maintained an intellectual infrastructure associated with biological or chemical weapons.

We are somewhat further along on chemical weapons because we really started working very hard on chemical weapons protection back in the mid '80s. We still have an awful long way to go. And Dick Macke remembers this from his days in the Pacific about the challenges that would come if we ever confront chemical weapons on the Korean peninsula, for example. An enormously difficult environment if we had to do that. But at least, in the area of chemical threats, we've spent some time thinking about the problem.

There's another dimension to this third mission, which is still unfolding in our minds. The Defense Threat Reduction Agency will be deeply involved in it, but not singularly involved in consequence management. Those of you who are familiar with the American defense establishment know that we have unified commanders in chief and the world is divided among them. There was one country that was never in a CINCs area of responsibility and that was the United States. Continental air defense fell under the jurisdiction of NORAD, but homeland defense belonged to no one. Those days are over. We are going to have to assign the United States to a CINC to start worrying about homeland defense.

And those of you who have been involved in any analysis associated with a terrorist act that might use chemical or biological weapons know, it is startling how soon this becomes a national security problem. It's within minutes, a chemical or biological terrorist act transcends the capability of local law enforcement or emergency responders. This will be a homeland defense issue, a national security issue if it were ever to happen. Over the next 16 to 18 months, we will be wrestling through all of the tough but essential details of assigning the United States



to a CINC and starting to develop real world war plans to defend this country.

The Defense Threat Reduction Agency becomes, as it were, the central nervous system for our counter-proliferation plans and preparation. We have to have an organization that can start with first principles, study the threat, what will it look like, and how do you deal with it. When it comes to chemical and biological weapons, we don't have that integrated intelligence assessment, today to be honest. We don't have an integrated view of this as a threat and what to do about it. And so that will become the first responsibility of the agency.

Now, in that regard, probably the most important thing that we'll be doing early with this agency, is to establish an advanced systems and concepts office for the Defense Threat Reduction Agency. That becomes the, as it were, the central nervous system for the new agency, helping us to think threats and requirements, and to take them in an integrated way into the resourcing and planning and programming for this agency. That will be the highest priority and our focus, really, between now and October 1st.

This Advanced Systems and Concept Office (ASCO) will be a fairly small organization, extensively utilizing Individual Professional Assignments (IPAs) from industry and academia to augment our talent. The Director of Central Intelligence has a counter proliferation agency and it took nearly nine months to hire two microbiologists. We can't use government personnel practices to try to stay up with this problem. We are going to have to utilize IPAs. And so we will have a small government civil service core, 20 to 30 people maybe, that constitute the bulk of the permanent force for the ASCO.

The rest of the staffing is going to be done through IPAs.

I think this is especially important because there is an astounding intellectual capital that exists on issues like biological technical developments in our pharmaceutical industry. We could never hope to replicate it, neither should we try. The private sector will be much more vibrant and current than anything we could create in the government. And so finding ways to link up with these organizations will become enormously important.

The last thing that we're doing with DTRA is creating a very senior panel of advisors, The Threat Reduction Advisory Committee. General Larry Welch, who's the head of IDA, is going to chair it. We have people like Bill Perry and George Whitesides; I tried to get John Shalikashvili, but he couldn't make it; Paul Wolfowitz; I'm hoping with a little bit of luck to get Bob Gallucci, but he's holding out on me; to try to be a part of this organization because we need early on to be able to develop a very clear vision to guide this organization over the next three to four years. I think our first meeting of the advisory committee is going to be next month. And, I think, most people are concerned that it's going to be very demanding. And I fear that it will be for the first 12 months. We'll be asking a lot from people in the first 12 months, but that'll be the most important time to get our grounding.

Finally, let me again, thank you General Curtin not just for inviting me here, but frankly, for hosting this event. I believe this kind of a conclave becomes an irreplaceable element for the future. I cannot contemplate dealing with this problem without having the resources of this sort of an association, this sort of a conference, to help

all of us deal with this challenging problem. We will be asking much more of all of you. I will be asking you to help us think through the most challenging national security problems that this country faces and frankly, all countries face. We share it together. And we're going to need all of you. I'm very serious. We're going to need all of you and your involvement and your professionalism and your expertise.

It isn't just an arms control issue, frankly. Many of you in the arms control world, frankly, are wrestling with the end of the Cold War just as much as we have been in the Department of Defense. There are an awful lot of changes that lie ahead for you. We share them together. I would like to conclude by saying the Department of Defense is actually your partner because we see this as our mission. Not the only mission. Because when you get right down to it, we're still going to go off and fight and win America's wars. But it is one of our primary missions to reduce the threat that we face and that all other countries face. And we're going to need your help. Thank you very much, Gary. Thank you for inviting me.

Q How is the United States Defense Threat Reduction Agency going to work in with NATO?

A First of all, I need to say that all of the constituent elements that currently exist in the Department of Defense will be transferred over DTRA. We've been very careful to make sure nothing falls off the table during the transition. And that, frankly, was one of General Curtin's and General Reppert's primary responsibilities, to make sure that in this transition, nobody fell off the truck on the way.

My first response to your question is that all of the existing patterns and associa-

tions will continue in the transition. In the long run, I hope what you're going to see is a much more coherent focus. Instead of having two or maybe three organizations that might be involved in the issue, you're going to get one organization plus the policy elements in OSD. So, I hope what it produces one-stop shopping for others when they want to deal with this problem, you will have one place to go.

Q With regard to continental defense, what will be the coordinating mechanism between DTRA and the National Infrastructure Protection Center in Department of Justice and the Critical Infrastructure Protection office in Commerce?

A Let me say at this point that we view these as somewhat separate problems and they are organizationally separate. The Department's response to the cyber issues and the infrastructure protection issues are really going to be coordinated through a different mechanism. It's going to be through the Assistant Secretary for Command, Control and Intelligence on the one hand. We will also be establishing a new military organization to deal with cyber defense. That is going to be resolved in the next six weeks or so, separate from the DTRA. DTRA has its hands full right now. And frankly, it is a somewhat different problem.

Now, let me describe to you the relationship of the department to the NIPC and then, I forget the name of the other one. ...CIAO (Critical Infrastructure Assurance Office) ...that's right, CIAO organization. Infrastructure protection is a very interesting problem. The Department of Defense is not responsible for any infrastructure inside the United States with the exception of locks and dams. And we do that because the Corps of Engineers has the responsibility. Other than that, we don't have any responsibilities

for infrastructure. It's deeply rooted in American Constitutional democracy that's evolved over the last hundred years, 125 years. The Department of Defense only deals with threats outside of the borders of the United States. If it's inside of the borders of the United States, it is a law enforcement problem.

I believe that's an artificial distinction. Cyberspace doesn't know geographical boundaries. We're looking at a future where frankly, DoD doesn't have any primary responsibility or jurisdiction, but almost inevitably will be pulled in very early in any cyber protection role. We are spending considerable resources right now dealing with the problems that we revealed to ourselves last year through an exercise called Eligible Receiver. The Lessons of Eligible Receiver reconfirmed in February when we were under attack by some hackers.

We really are substantially down the road in dealing with that problem now. We have committed ourselves and are supporting the National Infrastructure Protection Center. We provide the deputy and we'll provide, I believe, three of the five heads of the directorates. Because of our Constitutional orientation and our history, the Department of Defense is not going to be the lead in anything, but we will be backbone of everything when you get down to it. We are actively partnering with the Department of Justice and the FBI. I meet on a monthly basis with the Attorney General and with the director of the FBI as we are laying out our plans on the NIPC. We are, also creating a computer forensics capability on behalf of both DoD and the Justice Department. So we're very deeply involved with the NIPC.

Now as to the CIAO organization, that's just been created. It's slightly ambiguous because, I think, some people's visions

are grander than what can really be done by the organization. I mean you can't really take the responsibilities away from the organizations. So this organization is more responsible for coordination policy coordination.

Q Thank you. My name is Mr. (inaudible). I'm teaching arms control and proliferation issues at (inaudible) University in Ankara, Turkey. Although the primary concern of arms control has been nuclear as well as biological and chemical weapons, we all know that there is also a significant role for controlling conventional weaponry as well. I would, therefore, like to take this opportunity of being in same room with you, sir, to bring to your attention an extremely important subject that has not been touched upon during the conference here. I'm talking about the situation in Cyprus which is very likely to be the next big explosion to those of India and Pakistan.

As most of us know, the Russian anti-aircraft missiles will be soon dispatched to Cyprus upon the request of Greek Cypriots. Turkish military and security elites consider this missile deal as very serious challenge to Turkey's privacy toward the island and has a serious threat to Turkish national security. For reasons that I won't be dealing with here, Turks are determined to take all sorts of military measures, including a preventive strike to the missiles. In that, these options, it's unfortunately seemingly the most likely. Therefore, in case this occurs, there should be no doubt that the conflict will easily and quickly escalate to a war between Turkey and Greece, possibly inviting U.S. as well as Russian intervention. Considering that the costs of war between two NATO allies will be tremendous for all the parties concerned, I would like to know what concrete measures the U.S. administration is or will be taking short of the

rheterics of exercising restraint. It's what I'm telling my friends in the Turkish general staff that does me no good. Because they believe once these missiles are deployed to the island, it will be much more difficult to take them out during a conflict. Therefore, a preventive strike prevails as the most feasible option for them. So, I would like to hear that, I'm just speaking on my personal capacity and I'm just the spokesperson of all those who want to live in peace and harmony with our Greek friends. Thank you, sir.

A If I were here just to speak in my personal capacity, I'd be able to be more open in my discussion with you and so, I'm going to have to be controlled somewhat in my remarks.

The United States shares the concern that you uttered about the seriousness and the volatility of the situation. As you know, we have designated an individual to become a point person for dealing with it. And, in all honesty, there have been a series of fairly important discussions, which I'm not at liberty to go into. I think you are seeing the appropriate level of caution right now. I don't believe that there is anything that's happened right now that is irreversible. And there are very serious ongoing, very substantive discussions associated with it, working with all the parties that are affected by it. Forgive for me for not being able to go much further than that right now. I think we share, very much, your concern that this could be a situation that could quickly get out of hand and could quickly lead to unforeseeable consequences. And therefore, we're very anxious to take substantive steps to prevent it from happening. I'm sorry that I'm constrained from going further than that.

Q Sir, what CINC did you have in mind for working with DTRA? I'm from ACOM,

so I have no dog in that fight, really. (Laughter)

A Is ACOM America Command or Atlantic Command? I don't know. (Laughter) This is more complicated than Cyprus – (Laughter). And infinitely more dangerous. (Laughter) Logically, we have three commands that have an important role to play. We have NORAD and we've got Strategic Command and we have the Atlantic Command. I have my own personal preferences and views. But we are working that out right now inside the department. There obviously is a compromise solution, which is some kind of a joint task force. But I actually believe it needs to be grounded in a CINC. My personal view, but again, let me just state explicitly it's only a personal view and I don't want this to be forejudging either the Secretary's flexibility or his thinking on it, is that it's logical to put it with ACOM. But that is not a settled issue and there are very important equities that come to the table associated with other organizations.

Let me give you an example. I personally don't believe homeland defense is just a case of the United States. You have to think about Canada in this regard. For all practical purposes, we have an integrated infrastructure with Canada. If the power were to go out in Ontario, it would effect New York City. So you cannot think about it being just a United States homeland problem. And NORAD, of course, has had a long, very successful history of working closely with Canada. So it's not a trivial issue when I say that this is not yet resolved. We will resolve it here this summer. I gave you more information than I gave him. (Laughter) I'm sorry, I have to go. Thank you all. (Applause)

## PLENARY 3

### ARMS CONTROL IN THE REVOLUTIONARY ERA

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#### Introduction

The Revolution in Military Affairs (RMA) will facilitate a transformation of the Department of Defense that is necessary for shaping the international security environment and responding to the full range of military challenges over the next two decades. During this period, arms control is expected to serve as an important tool for shaping the international environment in ways favorable to U.S. interests and global security. Thus, while the RMA and arms control are separate enterprises, many of the goals they set out to achieve are similar. The concluding session of the conference explored broad topics relevant to future trends with the objective of creating a clearer picture of the international environment that the RMA and arms control will help to create. Panelists returned to several key issues raised during the conference sessions, including the relationship between the RMA and arms control; significant near-term

threats to U.S. national security; arms control in light of India and Pakistan's nuclear tests; the merits of the nuclear Nonproliferation (NPT) and Comprehensive Test Ban (CTBT) treaties; and the future of arms control in general.

#### Relationship between the RMA and Arms Control

Different perspectives concerning the impact of the RMA on arms control were prevalent among the panelists. According to one view, while the RMA might facilitate the performance of missions and enhance a nation's ability to perform coalition warfare, it does not matter very much for arms control. This view questions whether there is a "revolution" or an "evolution" in military affairs, pointing to the fact that widespread and significant technological and operational change within the armed forces is not likely to happen within the next 5 to 10 years. Other skeptics suggested that the RMA

would not change the domestic, economic, ethnic, and religious elements of the security environment. These factors and the general post-Cold War environment hamper the impact of the RMA on arms control.

On the other end of the spectrum, several panelists expressed the view that the RMA would have a considerable impact on arms control. One panelist indicated that the RMA could lower an adversary's threshold to use weapons of mass destruction (WMD) if that adversary was convinced he would be overwhelmingly defeated by RMA-enabled forces. Therefore, were the United States to fully pursue the RMA, the U.S. investment in counterproliferation and nonproliferation activities should be increased considerably to enable the United States to better prevent or resist weapons proliferation precipitated by the RMA. Another panelist pointed out that the precision strike responses enabled by the RMA could, ironically, make the United States deterrent less credible, since a potential chemical or biological weapons (CBW) user might be less convinced that the U.S. response to such an attack would involve nuclear weapons. Other views on the relationship between the RMA and arms control included the perspectives that RMA technologies could be used to augment inspection capabilities for certain arms control regimes and that the United States could be less constrained by arms control requirements relative to countries not pursuing RMA capabilities.

### **Near-Term Threats to U.S. National Security**

There was considerable disagreement among panelists concerning the greatest near-term threats to U.S. national security. One panelist proposed this threat to be the vulnerability of the U.S. information infrastructure because the potential impact of

an attack on this infrastructure could affect everything from air traffic control to banking. A second view held that the greatest near-term threat is the deterioration of the U.S. nuclear deterrent due to declining participation in the career field, declining visibility of nuclear operations, de-alerting of nuclear forces, and weakening of the acquisition and upgrade process. The panelist that stipulated this view indicated that this could lead to the eventual use of CBW against U.S. troops. Asymmetric threats, particularly loose nuclear weapons in the former Soviet Union (FSU), constituted a third perspective. Another panelist argued that the potential of a national security system overload, where simultaneous, overlapping, and interconnected threats become overwhelming, is the most significant threat facing U.S. security. A fifth and final position held that the most considerable near-term threat remains the one that has been greatest to the United States since the start of the Cold War: the potential detonation on U.S. soil of a nuclear weapon carried by a Russian intercontinental ballistic missile (ICBM).

Several interesting points were made to support the view that the greatest threat to U.S. national security is the potential of a national security system overload from simultaneous, overlapping and interconnected threats. One panelist made the argument that the United States is neither organized institutionally to deal with such a combination of threats, nor is the American public capable of, or interested in, dealing with their implications. These threats include the increasing numbers of WMD and of actors that consider the possession of these weapons to be of primary importance. The panelist indicated that in the future, the combination of the ongoing information technology and biotechnology revolutions might

lead to military applications of the technologies against the United States.

One potentially complicating aspect of overlapping, multiple threats – and perhaps a threat in itself – is the development of a fundamental tension between national security concerns and civil liberty concerns. Extraordinary public safety measures could be required to protect U.S. citizens and U.S. interests from overlapping threats. Such measures could be very intrusive and infringe upon individual freedoms. Consequently, it is likely that the kind of public support needed to implement these safety measures would be difficult to generate and sustain.

### **Implications for Arms Control in Light of the Nuclear Developments in India and Pakistan**

The panelists discussed the Indian and Pakistani nuclear tests and contemplated the relevance of these tests to arms control and nonproliferation efforts. In particular, they addressed the Indian perspective on U.S. nonproliferation policy, the potential requirement for a reassessment of U.S. nonproliferation policy, and steps that might be taken by the United States and the international community to respond to the tests.

#### ***The Indian Perspective***

The perspective of the Indian government was discussed among the panelists. Several panelists pointed to the fact that the United States has limited credibility in the eyes of Indians on the issue of proliferation for several reasons. The United States is viewed as the successor to the British, the latest in a series of imperialists that have interfered in Indian affairs. In addition, Indians perceive the United States to be unwilling to meet the commitments it made at the

time of the NPT. Specifically, despite the end of the Cold War and the reduction of its nuclear forces, the United States continues to reserve the right to use nuclear weapons when required to protect its national security. Finally, there is the view that U.S. nonproliferation efforts are hypocritical and nothing more than an attempt to maintain a nuclear oligopoly, shutting down the aspirations of other countries while keeping the nuclear club to a small group.

#### ***U.S. Nonproliferation Policy***

One panelist pointed out that there has been a fundamental tension since the 1960s on how best to pursue nonproliferation. On the one hand, there is the perception that the way to prevent the further spread of nuclear weapons is to respect specific restrictions on U.S. nuclear weapons and U.S. ability to use nuclear weapons. On the other hand, there is the view that a robust U.S. nuclear umbrella serves to deter proliferation by enabling nations to forego nuclear weapons. This dichotomy has yet to be resolved.

To address these contradictions, the panelist argued that the United States must reduce its dependence on nuclear weapons and rely more on cooperative efforts when dealing with potential proliferators and users of WMD. Moreover, since the threat of a U.S. nuclear response to a WMD attack is less than credible, the U.S. should increase its dependence on the deterrent effect of a threatened massive conventional response. In the panelist's view, the threat of a nuclear response is little more than reliance on a cheap solution that may not have a deterrent effect. Nuclear weapons are relatively inexpensive, but their catastrophic consequences would ultimately inhibit their employment by the United States. Therefore, the ability of the United States to mount conventional

military operations in response to a WMD attack is the only sufficiently credible threat.

### ***Possible Responses***

Panelists discussed a wide range of options for responding to the Indian and Pakistani nuclear tests. Suggestions ranged from the continued imposition of sanctions to providing permissive action links to the Indian and Pakistani governments to enhance stability. A proposal to provide assistance to India and Pakistan to better control their nuclear weapons received mixed reviews, with some panelists suggesting that such measures would assist in reducing the likelihood of preemptive or preventive war and inadvertent or unauthorized use of nuclear weapons. Other panelists cautioned that potential proliferators could perceive the provision of stabilizing assistance to India and Pakistan as a reward. The result might be to invite proliferation where it would otherwise not occur, since command and control issues might be one factor inhibiting nuclear aspirants from developing or acquiring nuclear weapons. Panelists briefly debated the notion of providing India and Pakistan with security guarantees. One panelist remarked that the Indians were unlikely to believe that anyone would give them a credible security guarantee against China, while the Pakistanis similarly were unlikely to conclude that they could obtain a credible security guarantee against India over the issue of Kashmir.

Regarding the diplomatic approach, there was limited agreement among panelists over an appropriate response. While some panelists advocated the limited application of sanctions, others were concerned that sanctions could be very deleterious to U.S. national, as well as international security. The application of prolonged sanctions could lead to a *quid pro quo* arrangement

between nations of the Middle East and Pakistan where nuclear technology could be exchanged for financial support to counter the effects of sanctions. One potential solution would be to incorporate a “sunset” provision into any applied sanctions in which a clearly defined deadline for the sanctions is outlined in the beginning. Moreover, the appropriateness of sanctions is a significant issue because India and Pakistan are not signatories to the NPT, and did not break any international laws or commitments.

While there seemed to be general agreement among the panelists that flexibility in U.S. diplomacy, improved communications, and further in-depth analysis of the region are critical to resolving the situation, some panelists were concerned about the possibility of setting a poor precedent. The precedent of the response of the United States and the international community to the Indian/Pakistani tests is extraordinarily important, since any perception that India and Pakistan have gained from their actions would be an enormously dangerous development. The United States and the international community, in order to draw the line regarding future additions to the nuclear club, need to clearly show that no benefits will come from testing.

### **The Merits of the NPT and CTBT**

One panelist extolled the value of the NPT, asserting that it is the sole reason why the Indian and Pakistani nuclear tests are viewed as extraordinarily dangerous events, rather than as normal consequences of the advanced technological know-how of these two nations. Had the nuclear nonproliferation regime never been developed, India and Pakistan would have tested their nuclear weapons decades ago, and the world would have been much more dangerous. The pan-



elist concluded that the world would become more perilous if the NPT is abandoned.

Diverging perspectives were revealed in panelists' remarks addressing the CTBT. One panelist argued that the CTBT is of questionable relevance to preventing proliferation and is potentially harmful to the United States, since nuclear testing remains the guarantor of the safety and reliability of the U.S. nuclear stockpile. In this panelist's view, erosion in the credibility of the U.S. nuclear deterrent due to the absence of nuclear testing could lead to proliferation in other areas of the world. The CTBT is a historical phenomenon whose time has gone by, the panelist argued, since advanced technology has enabled nations to develop and stockpile nuclear weapons without the accompanying nuclear tests. Furthermore, the test ban has failed to accomplish any of the purposes for which it was intended, since countries can still find ways to develop new weapons, maintain nuclear stockpiles, and continue to threaten the use of nuclear weapons, according to the panelist. Thus, those who thought that the CTBT would constrain or lead to the erosion of nuclear weapons were wrong. Another panelist pointed out that, like a number of other policy areas, arms control and the CTBT are influenced by and a product of multiple objectives. The Treaty reflects the simultaneous needs to maintain alliance systems, minimize WMD proliferation, and reduce the profile and salience of nuclear weapons in the post-Cold War world.

### **The Future of Arms Control**

The panelists described arms control as a dynamic concept that changes with the times and with the threats. Not only are increasingly diverse measures and resources being employed for arms control purposes, but the diffusion of arms control concepts

into the commercial arena is occurring as well. For example, one panelist indicated that arms control broadly defined might include confidence and security building measures (CSBMs), transparency arrangements, and nonproliferation efforts.

One panelist discussed a new development in arms control, a so-called "revolution in arms control." This refers to the increasing reliance on private industry to help implement creative and effective arms control arrangements. For example, the expertise to make a CBW control regime work lies in the pharmaceutical and biotechnology industries. In the information technology world, it would be impossible to address the threat of cyber-terrorists without the help of private industry. Perhaps most importantly, the phenomena of "loose nukes" and "brain drain" have been mitigated to a certain extent by private companies who hire former nuclear weapons scientists for projects unrelated to military endeavors. These are examples of using private industry to augment traditional arms control efforts.

While it is clear that arms control is evolving to meet new threats, panel members expressed two general cautions. One panelist indicated that the definition of arms control could be stretched too far. Arms control, the panelist stated, consists primarily of political, economic, diplomatic, and technological measures used to reduce threats. It is inappropriate to refer to nuclear deterrence and counterproliferation as forms of arms control rather than military capabilities. Arms control, therefore, is not a panacea for the dissolution of threats, but one piece of a national security strategy. Another caution raised by the panelists concerned the continued role of traditional arms control measures. International arms control regimes serve to develop a code of conduct, a way of thinking, and a set of norms to

which most governments in the world adhere. These regimes are a necessary but not sufficient condition to control threats.

The panelists also presented varying perspectives on future arms control scenarios that would enhance international security. One panelist suggested that negotiated global multilateral treaties as well as bilateral treaties between the United States and Russia would decrease in importance. Major enhancements in stability would more likely be achieved through regional arms control arrangements. Another panelist indicated that an agreement on global nuclear disarmament, while permitting the continuing existence of some nuclear devices as a protection against cheating is highly desirable.

## Summary

The future international security environment is uncertain and poses a range of significant threats to U.S. national interests, including the vulnerability of the U.S. information infrastructure; the deterioration of the U.S. nuclear deterrent; susceptibility to “asymmetric” threats; loose warheads or the dissemination of expertise from the FSU; inadvertent or accidental launch of Russian ICBMs armed with WMD; or a national security system overload caused by some combination of these elements.

This environment must be considered in any redefining or reassessing of arms control and, in turn, the role arms control plays in reducing or mitigating the impact of each element on U.S. national security. Consideration must also be given to the notion of whether the United States has reached a point where its ability to advocate arms control regimes is questionable due to inherent contradictions in its approach toward the use and role of nuclear weapons.

The full impact on arms control and nonproliferation of the Indian and Pakistani nuclear tests has yet to be ascertained, but it is clear that new thinking is warranted. This is particularly true for several issues, including the appropriate response over time of the United States to the Indian and Pakistani tests, the relationship of the United States to the South Asian region as a whole, and U.S. nonproliferation policies in general. The panelists mostly agreed that the United States must reduce its dependence on nuclear weapons and rely more on cooperative efforts when dealing with potential proliferators and users of WMD.

Arms control is a very dynamic concept that changes with the appearance of new threats. While new forms of arms control, including the participation of the private sector in realizing arms control goals, have already begun to play an important role, traditional arms control that enables the development of codes of conduct, ways of thinking, and international norms will continue to remain significant. Finally, although the RMA is likely to impact arms control in some manner, it is not clear to what extent these two processes will affect one another. It is clear, however, that while the RMA and arms control are two different enterprises, many of the goals they attempt to achieve are similar.

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## ABBREVIATIONS AND ACRONYMS

ABM	Anti-Ballistic Missile Treaty
APL	Anti-Personnel Landmine
BJP	Bharatiya Janata Party
BW	Biological Weapon
BWC	Biological Weapons Convention
C4ISR	Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance
CBW	Chemical/Biological Weapon
CFE	Conventional Armed Forces in Europe Treaty
CINC	Commander in Chief
CSBM	Confidence and Security Building Measure
CTBT	Comprehensive Test Ban Treaty
CTR	Cooperative Threat Reduction Program
CVR	Center for Verification Research
CW	Chemical Weapon
CWC	Chemical Weapons Convention
DARPA	Defense Advanced Research Projects Agency
DoD	Department of Defense
DOE	Department of Energy
DSWA	Defense Special Weapons Agency
DTRA	Defense Threat Reduction Agency
EIF	Entry-Into-Force
FSU	Former Soviet Union
IAEA	International Atomic Energy Agency
ICBM	Intercontinental Ballistic Missile
INF	Intermediate-Range Nuclear Forces Treaty
ISTC	International Science & Technology Center
NAS	National Academy of Sciences
NGO	Non-Governmental Organization
NMD	National Missile Defense
NPT	Nonproliferation Treaty
NTM	National Technical Means
OPCW	Organization for the Prohibition of Chemical Weapons
OSCE	Organization for Security and Cooperation in Europe
OSIA	On-Site Inspection Agency

PDD	Presidential Decision Directive
R&D	Research and Development
RMA	Revolution in Military Affairs
SAIC	Science Applications International Corporation
START	Strategic Arms Reduction Treaty
TMD	Theater Missile Defense
WMD	Weapons of Mass Destruction